



FINAL



**ENVIRONMENTAL ASSESSMENT FOR THE REPAIR,
RECONSTRUCTION, AND/OR REPLACEMENT OF THE
MAIN BASE RUNWAY,
EDWARDS AIR FORCE BASE, CALIFORNIA**

September 2004

**95th AIR BASE WING
ENVIRONMENTAL MANAGEMENT
EDWARDS AFB CA 93524**

Report Documentation Page			Form Approved OMB No. 0704-0188					
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1. REPORT DATE 16 SEP 2004	2. REPORT TYPE	3. DATES COVERED						
4. TITLE AND SUBTITLE Final Environmental Assessment for the Repair, Reconstruction, and/or Replacement of the Main Base Runway			5a. CONTRACT NUMBER					
			5b. GRANT NUMBER					
			5c. PROGRAM ELEMENT NUMBER					
6. AUTHOR(S)			5d. PROJECT NUMBER					
			5e. TASK NUMBER					
			5f. WORK UNIT NUMBER					
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) JT3/CH2M HILL,190 S Wolfe, Building 1260,Edwards ,CA,93524		8. PERFORMING ORGANIZATION REPORT NUMBER						
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)			10. SPONSOR/MONITOR'S ACRONYM(S)					
			11. SPONSOR/MONITOR'S REPORT NUMBER(S)					
12. DISTRIBUTION/AVAILABILITY STATEMENT Approved for public release; distribution unlimited.								
13. SUPPLEMENTARY NOTES								
14. ABSTRACT <p>This report presents the results of the Environmental Assessment (EA) which evaluates the potential environmental effects associated with the proposed repair, reconstruction, and/or replacement of the existing Main Base runway (Runway 04/22) at Edwards Air Force Base (AFB), California. Pursuant to the National Environmental Policy Act of 1969 (NEPA), this EA has been prepared to analyze the potential environmental consequences of the proposed action. The proposed project would involve the repair, reconstruction, and/or replacement of the Main Base Runway, Runway 04/22. The analysis in this EA illustrates that none of the environmental impacts from the proposed action would be significant if the required/recommended minimization measures are followed. This analysis resulted in a Finding of No Significant Impact (FONSI) based on the absence of significant adverse impacts to the environment.</p>								
15. SUBJECT TERMS								
16. SECURITY CLASSIFICATION OF: <table border="1"> <tr> <td>a. REPORT unclassified</td> <td>b. ABSTRACT unclassified</td> <td>c. THIS PAGE unclassified</td> </tr> </table>			a. REPORT unclassified	b. ABSTRACT unclassified	c. THIS PAGE unclassified	17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES 154	19a. NAME OF RESPONSIBLE PERSON
a. REPORT unclassified	b. ABSTRACT unclassified	c. THIS PAGE unclassified						

Environmental Assessment for the Repair, Reconstruction, and/or Replacement of the
Main Base Runway,
Edwards Air Force Base, California
AF Form 813 #01-896

Contract
F42650-01-C-7218
Letter of Technical Direction
1B022000-0001

September 2004

Prepared by:

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The views, opinions, and findings contained in this report are those of the author(s) and should not be construed as an official Department of the Air Force, Air Force Materiel Command (AFMC), position, policy or decision, unless so designated by other documentation.

For:
Air Force Flight Test Center
Environmental Management
Edwards AFB CA

**FINDING OF NO SIGNIFICANT IMPACT
FOR THE REPAIR, RECONSTRUCTION, AND/OR REPLACEMENT OF
THE MAIN BASE RUNWAY,
EDWARDS AIR FORCE BASE, CALIFORNIA**

1.0 INTRODUCTION

The purpose of the proposed action, the repair, reconstruction, and/or replacement of the existing Main Base runway (Runway 04/22), is to maintain or construct a runway that would provide a safe and reliable takeoff and landing strip; to reduce the potential for foreign object damage (FOD) hazards to aircraft and pilots; and to provide a runway that would last 40-plus years, meets the standards of current and future flight test activities, and is in compliance with current Air Force (AF) regulations and policies.

Under Alternative A, the Preferred Alternative, the AFFTC proposes to construct a new 12,000-foot-long, 200-foot-wide Class B runway approximately 2,500 feet north of the centerline of Runway 04/22. A total of 2,000 feet of overrun/underrun would also be constructed under this alternative. A batch plant operations area(s) to be used for asphalt and concrete production would be sited, assembled, and operated. Approximately 102,000 tons of material would be required for the 12,000-foot-long, 200-foot-wide runway and 500,000 cubic yards of concrete would be required for the reconstruction of Runway 04/22. Runway 04/22, approximately 15,000 feet long and 300 feet wide, would be demolished and reconstructed. Runway 04/22 would continue to be used during construction of the new 12,000-foot runway. Construction and demolition/reconstruction activities are anticipated to occur over a 3-year period, from fiscal year (FY)06 through FY08.

Under Alternative B, a new 15,000-foot-long, 300-foot-wide Class B runway would be constructed between existing Runway 04/22 and the current ramp facilities. The 15,000-foot-long runway would be constructed approximately 2,500 feet north of the centerline of Runway 04/22. A batch plant operations area is proposed to be located north of the proposed new runway location. Approximately 300,000 cubic yards of concrete would be required for this alternative. No disruptions in flight operations would occur under this alternative. Runway 04/22 would continue to be used during construction of the new runway and would continue to be used and repaired on an as-needed basis until complete failure once the new 15,000-foot runway is operational. Upon complete runway failure, Runway 04/22 would be decommissioned in-place. Construction activities are expected to take approximately 1 year.

Under Alternative C, the No Action Alternative, Runway 04/22 would continue to degrade and FOD-related emergencies would continue to increase. Currently, the runway is swept three times a day. Repairs have been conducted as necessary, but complete failure of the runway is anticipated to occur in FY08. Runway 04/22 would continue to be repaired on an as-needed basis or until complete runway failure occurs, at which time it would be decommissioned in-place.

The Environmental Assessment (EA) documents the analysis of the activities required to repair, reconstruct, and/or replace Runway 04/22 and supports this finding.

2.0 ENVIRONMENTAL EFFECTS

The proposed repair, reconstruction, and/or replacement of Runway 04/22 is not expected to significantly alter the productivity of the environment. This EA has analyzed several components of the natural and manmade environment for potential impacts as a result of the proposed action. The potential impacts evaluated included: Land Use, Air Quality, Water Resources, Safety and Occupational Health, Hazardous Materials and Waste, Biological Resources, Cultural Resources, Geology and Soils, Socioeconomics, and Infrastructure. No potentially significant impacts were identified in any of these areas.

3.0 FINDINGS

A Finding of No Significant Impact (FONSI) for the Proposed Action has been determined based on the absence of significant adverse impacts to the environment. Background information that supports the research and development of this FONSI and the EA is on file at Edwards AFB and can be obtained by contacting the following:

95 ABW/EM
Environmental Management
Attn: Mr. Gary Hatch
5 East Popson Avenue, Building 2650A
Edwards AFB CA 93524-8060
(661) 277-1454


ROBERT W. WOOD, Director
Environmental Management

16 Sept 2004
Date

COVER SHEET

ENVIRONMENTAL ASSESSMENT FOR THE REPAIR, RECONSTRUCTION, AND/OR REPLACEMENT OF THE MAIN BASE RUNWAY, EDWARDS AIR FORCE BASE, CALIFORNIA

- a. Lead Agency: U.S. Air Force
- b. Cooperating Agency: None
- c. Proposed Action: Repair, Reconstruction, and/or Replacement of the Main Base Runway, Edwards Air Force Base, California
- d. Inquiries on this document should be directed to the 95th Air Base Wing (95 ABW), Environmental Management (95 ABW/EM), Attn: Gary Hatch, 5 East Popson Avenue, Building 2650A, Edwards Air Force Base, California 93524-1130, (661) 277-1454 or e-mail gary.hatch@edwards.af.mil.
- e. Designation: Final Environmental Assessment (EA)
- f. Abstract: Pursuant to the *National Environmental Policy Act of 1969*, this EA has been prepared to analyze the potential environmental consequences of the proposed action. The proposed project would involve the repair, reconstruction, and/or replacement of the Main Base Runway, Runway 04/22. The analysis in this EA illustrates that none of the environmental impacts from the proposed action would be significant if the required/recommended minimization measures are followed.

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LIST OF ABBREVIATIONS AND ACRONYMS

412 OG	412 th Operations Group
412 OSS/OSAM	Airfield Management
412 TW	412 th Test Wing
412 TW/LGQ	412 th Test Wing Quality Assurance Inspection Branch
412 TW/MXG	412 th Test Wing Maintenance Group
95 ABW	95 th Air Base Wing
95 ABW/CE	95 th Air Base Wing/Civil Engineer Directorate
95 ABW/CEC	95 th Air Base Wing (Functional Area Staff)
95 ABW/EM	95 th Air Base Wing/Environmental Management
95 ABW/EMC	95 th Air Base Wing/Environmental Management Compliance Branch
95 ABW/EMCC	95 th Air Base Wing/Environmental Management Compliance Branch
95 ABW/EMR	95 th Air Base Wing/Environmental Management Remediation Division
95 ABW/EMX	95 th Air Base Wing/Environmental/Plans and Programs
95 ABW/EMXC	95 th Air Base Wing/Environmental Management Conservation Branch
95 ABW/IT	95 th Air Base Wing/Information Technology
95 AMDS/SGPB	95 th Aerospace Medical Squadron/Bioenvironmental Engineering
95 MSG/SVRL	95 th Mission Support Group
AB	Assembly Bill
ABL	Airborne Laser
ACCS	accumulation site
ADCA	Animal Damage Control Act
AF	Air Force
AFB	Air Force Base
AFCEE	Air Force Center for Environmental Excellence
AFFTC	Air Force Flight Test Center
AFFTCI	Air Force Flight Test Center Instruction
AFFTC/JA	Air Force Flight Test Center/Judge Advocate
AFFTC/PA	Air Force Flight Test Center/Public Affairs
AFFTC/SE	Air Force Flight Test Center/Safety Office
AFFTC/XP	Air Force Flight Test Center/Plans and Programs
AFI	Air Force Instruction
AFJMAN	Air Force Joint Manual
AFMC/CE	Air Force Materiel Command Civil Engineers
AFOSH	Air Force Occupational Safety and Health
AFPD	Air Force Policy Directive
AFR	Air Force Regulation
AFRL	Air Force Research Laboratory
AICUZ	Air Installation Compatible Use Zone
AIRFA	American Indian Religious Freedom Act
AOC	area of concern
APCD	Air Pollution Control District
APZ	accident potential zone
AQMD	Air Quality Management District
ARAR	Applicable or Relevant and Appropriate Requirement
ARB	Air Resources Board

LIST OF ABBREVIATIONS AND ACRONYMS (Continued)

ARG	Assessment Review Group
ASR	Alkali-Silica Reaction
ATC	authority to construct
AVAQMD	Antelope Valley Air Quality Management District
AVEK	Antelope Valley-East Kern
B	billion
BACT	Best Available Control Technology
BASH	Bird Aircraft Strike Hazard
BFTF	Birk Flight Test Facility
BHPO	Base Historic Preservation Officer
BMP	best management practice
bhp	brake horsepower
CAA	Clean Air Act
CAAA	Clean Air Act Amendments
CAAQS	California Ambient Air Quality Standards
CARB	California Air Resources Board
CATEX	categorical exclusion
CCAA	California Clean Air Act
CCR	California Code of Regulations
CDFG	California Department of Fish and Game
CDW	construction/demolition waste
CEQ	Council on Environmental Quality
CEQA	California Environmental Quality Act
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CESA	California Endangered Species Act
CFR	Code of Federal Regulations
CO	carbon monoxide
CUPA	Certified Unified Program Agency
CWA	Clean Water Act
CZ	clear zone
Cal/EPA	California Environmental Protection Agency
Cal-OSHA	California Occupational Safety and Health Administration
DDMS	Department of Defense Manned Space Flight Support Office
DFRC	Dryden Flight Research Center
DNL	day-night average sound level
DOD	Department of Defense
DODD	Department of Defense Directive
DODI	Department of Defense Instruction
DOT	Department of Transportation
DRMO	Defense Reutilization Marketing Office
DTSC	Department of Toxic Substances Control
dB	decibel
EA	Environmental Assessment
EDAPCD	El Dorado Air Pollution Control District
EIAP	Environmental Impact Analysis Process

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LIST OF ABBREVIATIONS AND ACRONYMS (Continued)

EIR	economic impact region
EO	Executive Order
EPCRA	Emergency Planning and Community Right-to-Know Act
ERP	Environmental Restoration Program
ESA	Endangered Species Act of 1973
FAA	Federal Aviation Administration
FFA	Federal Facility Agreement
FOD	foreign object damage
FONSI	Finding of No Significant Impact
FY	fiscal year
HAP	hazardous air pollutant
HASP	Health and Safety Plan
HDDT	heavy-duty diesel truck
HDGT	heavy-duty gasoline truck
HWMP	Hazardous Waste Management Plan
HWSF	Hazardous Waste Storage Facility
IAP	initial accumulation point
ICE	internal combustion engine
IFR	instrument flight regulations
ILS	instrument landing system
INRMP	Integrated Natural Resources Management Plan
JP	jet propulsion fuel
JPL	Jet Propulsion Laboratory
KCAPCD	Kern County Air Pollution Control District
LDDT	light-duty diesel truck
LDGT	light-duty gasoline truck
LDGV	light-duty gasoline vehicle
Ldn	day/night equivalent noise level
lb	pound
M	million
MBTA	Migratory Bird Treaty Act
MDAB	Mojave Desert Air Basin
MDAQMD	Mojave Desert Air Quality Management District
MSDS	material safety data sheet
mph	miles per hour
N/A	Not Applicable
NAAQS	National Ambient Air Quality Standards
NAGPRA	Native American Graves Protection and Repatriation Act
NASA	National Aeronautics and Space Administration
NDIR	Nondispersive Infrared Photometry
NEPA	National Environmental Policy Act of 1969
NESHAP	National Emissions Standards for Hazardous Air Pollutants
NHPA	National Historic Preservation Act of 1966
NO ₂	nitrogen dioxide
NO _x	oxides of nitrogen

LIST OF ABBREVIATIONS AND ACRONYMS (Concluded)

NPL	National Priorities List
NRCS	Natural Resource Conservation Service
NRHP	National Register of Historic Places
NSR	New Source Review
O ₃	ozone
OSHA	Occupational Safety and Health Administration
PCI	Pavement Condition Index
PIRA	Precision Impact Range Area
PL	Public Law
PM	particulate matter
PM2.5	particulate matter less than or equal to 2.5 microns/respirable particulate matter
PM10	particulate matter less than or equal to 10 microns/fine particulate matter
POV	personally owned vehicle
PPA	Pollution Prevention Act of 1990
PPOA	Pollution Prevention Opportunity Assessment
PRG	preliminary remediation goal
PTE	potential to emit
PTO	permit to operate
Pb	lead
ppm	parts per million
RCRA	Resource Conservation and Recovery Act of 1976
R.E.A.	Registered Environmental Assessor
RMCC	Ridley Mission Control Center
RWQCB	Regional Water Quality Control Board
SAR	Special Access Required
SCAQMD	South Coast Air Quality Management District
SCS	Soil Conservation Service
SEPRC	State Emergency Planning and Response Commission
SIP	State Implementation Plan
SMAQMD	Sacramento Metropolitan Air Quality District
SMU	Stormwater Management Unit
SO ₂	sulfur dioxide
SO _x	sulfur oxides
SWDA	Stormwater Drainage Area
SWPPP	Stormwater Pollution Prevention Plan
T&E	test and evaluation
TAC	toxic air contaminant
TLC	Total Lung Capacity
TPS	Test Pilot School
TRI	Toxic Release Inventory
TSE	Tactical Support Equipment
TTLC	Total Threshold Limit Concentration
tpy	tons per year
UFC	Unified Facilities Criteria

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LIST OF ABBREVIATIONS AND ACRONYMS (Concluded)

U.S.	United States
USACE	United States Army Corps of Engineers
USAF	United States Air Force
USC	United States Code
USDA	United States Department of Agriculture
U.S. EPA	United States Environmental Protection Agency
USFWS	United State Fish and Wildlife Service
VFR	visual flight regulations
VOC	volatile organic compound
VTG	Valencia Technology Group
Vmcg	minimum control speed on the ground
VMT	vehicle miles traveled
WSSH	White Sands Space Harbor
$\mu\text{g}/\text{m}^3$	1×10^{-6} grams per cubic meter

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1.0 INTRODUCTION

This Environmental Assessment (EA) evaluates the potential environmental effects associated with the proposed repair, reconstruction, and/or replacement of the existing Main Base runway (Runway 04/22) at Edwards Air Force Base (AFB), California.

This EA was prepared in accordance with (IAW) the requirements of the *National Environmental Policy Act* (NEPA) of 1969, as amended (42 United States Code [USC] 4321 et seq.); the *Council of Environmental Quality (CEQ) Regulations for Implementing the Procedural Provisions of NEPA* (40 Code of Federal Regulations [CFR] 1500–1508); and Air Force Instruction (AFI) 32-7061, *The Environmental Impact Analysis Process*. Air Force Instruction 32-7061 completely adopts Title 32 CFR Part 989, *Environmental Impact Analysis Process (EIAP)*. The United States Air Force Flight Test Center (AFFTC) is representing the Department of Defense (DOD) as the lead agency.

1.1 Background

For more than 50 years, Edwards AFB, home of the AFFTC, has been the location of major milestones in flight. The AFFTC conducts and supports research, development, test, and evaluation of aerospace systems from concept to combat.

Edwards AFB has three paved runways that provide the principal takeoff and landing surfaces for the Base: North Base (Runway 06/24), South Base (Runway 06/24), and Main Base (Runway 04/22). These runways are divided into two different classes: A and B. The type of aircraft using the runway determines the runway class. Class A runways are designed for small, light aircraft. Class B runways are designed for high performance and large, heavy aircraft. Runway 04/22, the primary airstrip for the Base, is a Class B runway. The North and South Base runways are Class A runways. In addition, the Base has 18 runways painted on Rosamond and Rogers Dry Lakes, and uses the remaining lakebed areas for emergency landings.

In September 1998 the Valencia Technology Group (VTG) and the United States Army Corps of Engineers (USACE) conducted a surface evaluation of all airfield pavements at Edwards AFB. The objective of this evaluation was to update the condition of those areas previously inspected and to generate a set of recommendations for near- and long-term maintenance work. In July 1999, a follow-up evaluation was conducted on Runway 04/22 and Taxiways A, B, and C. The *Updated Airfield Pavement Evaluation, Edwards AFB Main Base* (VTG 1999) report states that “although the overall conditions of the pavements are good to very good, most of the pavements have greatly exceeded their design life and are reaching the point where major rehabilitation would be required in the next 5 to 10 years.” It also recommended that a condition called “pumping” be monitored on the midfield portion of Runway 04/22.

Air Force Joint Manual (AFJMAN) 32-1038, *Procedures for US Army and US Air Force Airfield Pavement Condition Surveys*, states that “pumping” is the ejection of material by water through joints or cracks caused by deflection of the slab under passing loads. As the water is ejected, it carries particles of gravel, sand, clay, or silt, resulting in a progressive loss of pavement support. Base or subgrade material on the pavement adjacent to joints or cracks and/or surface staining is evidence of pumping. Pumping near joints indicates poor joint sealer and loss

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of support, which leads to cracking under repeated loads. If this condition persists, it could result in failure.

The condition of runway pavement is measured using a standard system called Pavement Condition Index (PCI). The PCI is a numerical rating that indicates the type and severity of the inspected distress. The PCI system rates the pavement condition on a scale of 0 to 100, with 100 being the best. The airfield condition survey and the resulting PCI are the primary means of obtaining and recording important airfield pavement performance data. The pavement condition rating scale and corresponding PCI are presented in Table 1.

**TABLE 1
PAVEMENT CONDITION INDEX RATING SCALE**

Pave Condition Index	Rating
100	Excellent
85	Very Good
70	Good
55	Fair
40	Poor
25	Very Poor
10	Failed

The PCI numbers for portions of Runway 04/22 have declined rapidly over the past few years, indicating that the pavement is near the end of its usable life. Table 2 presents data that illustrate the rate of degradation through the decline of the PCI numbers from 1995 to 1999.

**TABLE 2
PAVEMENT CONDITION INDEX CHANGE MATRIX**

Description	1995 PCI	1999 PCI	Change	Percent of Change
Runway 04 Touchdown Area	80.0	64.0	16.0	20.00
Runway 04 Midfield Area	84.0	73.0	11.0	13.10
Center Hammerhead	90.0	83.0	7.0	7.78
Runway 22 Midfield Area	84.0	81.0	3.0	3.57

Note: PCI - Pavement Condition index

Source: *Updated Airfield Pavement Evaluation, Edwards AFB Main Base* (Valencia Technology Group [VTG] 1999)

The cause of the rapid degradation of the concrete has been identified as Alkali-Silica Reaction (ASR). The ASR is a condition brought about by a reaction between the cement and the aggregate in the concrete. The ASR results in a gel-like substance that absorbs moisture and swells, thus causing increased map cracking, scaling, and spalling along the slab joints and corners.

Map cracking refers to a network of small, fine, hairline cracks that extend only through the upper surface of the concrete. The thickness of the runway varies from approximately 17 to 19 inches. Therefore, this cracking does not substantially affect the structural capacity of the runway, but it does create continuous foreign object damage (FOD) problems. The term FOD refers to damage, particularly to aircraft, that occurs as a result of a collision with or ingestion of objects on or around runways, taxiways, and other areas of aircraft operations. Scaling is the breakdown of the slab surface to a depth of approximately $\frac{1}{4}$ to $\frac{1}{2}$ inch. Deicing salts, improper construction, freeze-thaw cycles, and poor aggregate are typical causes of scaling. Products formed by the ASR result in expansions that cause a breakdown in the concrete. This generally occurs throughout the slab and not just at the joints.

Runway requirements are dictated by the aircraft currently operating at Edwards AFB as well as from projected future requirements. The minimum length requirement for flight operations of the majority of aircraft currently assigned to the AFFTC is 12,000 feet. However, the KC-135E and T-38C aircraft can require runway lengths up to 15,000 feet due to reduced aircraft engine power and efficiency during higher summer temperatures. Also, the numerous preproduction, research, and high-risk experimental aircraft that are routinely tested at Edwards AFB require a longer and wider runway to safely mitigate the various anomalies encountered during flight testing.

The AFFTC, at the direction of the Department of Defense Manned Space Flight Support Office (DDMS), has committed to utilize and provide AFFTC assets as an emergency and contingency landing site for the space shuttle. The AFFTC commitment includes the current operational runways and lakebeds as well as air traffic control, range, medical, security, emergency search and rescue response forces, and fire/crash and rescue forces. Any of the proposed alternatives that disrupt the availability of the current runway would have a significant adverse effect on the AFFTC commitment to serve as an emergency or contingency landing site for the space shuttle. Orbiter operations require the runway be available during launch, orbit, and landing as an emergency/alternate landing site.

The National Aeronautics and Space Administration (NASA) space shuttle orbiter requirements also contribute to required runway availability and dimensions. The space shuttle orbiter requires a runway 15,000 feet long and 300 feet wide to conduct landing operations.

In addition to a longer length, past aircraft testing has shown the need for a runway width of 300 feet. The minimum control speed for on-the-ground (V_{mcg}) testing of multiengine aircraft involves beginning takeoff, failing an outboard engine, and measuring how much the aircraft swerves to the side. To reduce the hazard of running off the runway during this testing and thereby damaging an aircraft, a wider runway must be available. A 300-foot wide runway also provides sufficient width for offset takeoffs and unusual configurations. Other tests that demand increased width include sidestep maneuvers to check for contingencies including crosswind takeoffs, crosswind landings for new aircraft until limits are established, and wet-runway testing that has the potential for blown tires.

1.2 Purpose and Need for the Proposed Action

The purpose of the proposed action, repair, reconstruction, and/or replacement of the existing Main Base runway (Runway 04/22), is to maintain or construct a runway that would provide a safe and reliable takeoff and landing strip; reduce the potential for FOD hazards to aircraft and pilots; provide a runway that would last 40-plus years; provide a runway that meets the standards of current and future flight test activities; and provide a runway that is in compliance with current Air Force (AF) regulations and policies.

Homeland security is a visible priority at Edwards AFB. Following the terrorist actions that took place in September 2001, Edwards AFB became a follow-on point of embarkation for aircraft deployment in support of America's war on terrorism. In the future, other unexpected events might again create a need for such contingency missions. Edwards AFB is a national asset for flight test activities, offering a unique combination of airspace, facilities, and emergency landing surfaces.

Runway 04/22 was originally constructed in the 1950s. Approximately 65 to 80 test flights per day depend upon Runway 04/22 for mission-related activities. Surface evaluations of airfield pavements at Edwards AFB have concluded that most of the pavements have exceeded their design life and are reaching the point where major rehabilitation would be required. Specifically, "pumping" and ASR have caused the runway to deteriorate, and PCI numbers indicate that the pavement is near the end of its usable life.

Aircraft engine ingestion of FOD requires engine borescope inspections to determine the extent of damage caused by aircraft engine ingestion of FOD. Approximately 200 man-hours during fiscal year (FY) 03 and the first 9 months of FY04 were spent performing these inspections. There were also approximately 12 instances where minor repairs were done due to rock/sand damage where a full borescope inspection was not required. These required approximately 4 man-hours per incident. Additionally, the Civil Engineering Group (95 ABW/CE) dedicates over 500 man-hours per year for spall, joint, and FOD repair activities.

The majority of the ASR, map cracking, scaling, and spalling is occurring in the midfield and end portions of Runway 04/22. The ASR is creating a serious increase in FOD. The runway would eventually become unsafe for aircraft operations if allowed to continue. Concrete fragments measuring several inches across are routinely recovered as the cracking progresses. There is no feasible method for correction of these deteriorations other than by replacement. Without correction, it is anticipated that Runway 04/22 would fail in FY08.

1.3 Location and Scope of the Proposed Action

Edwards AFB is located in the Antelope Valley region of the western Mojave Desert in Southern California. It is approximately 60 miles northeast of Los Angeles, California. The Base occupies an area of approximately 301,000 acres or 470 square miles. Portions of the Base lie within Kern, Los Angeles, and San Bernardino counties (Figure 1).

Proposed project activities would be located in the Main Base portion of Edwards AFB. Specifically, project activities would occur on and adjacent to Runway 04/22, within the Main Base flightline area (Figure 2).

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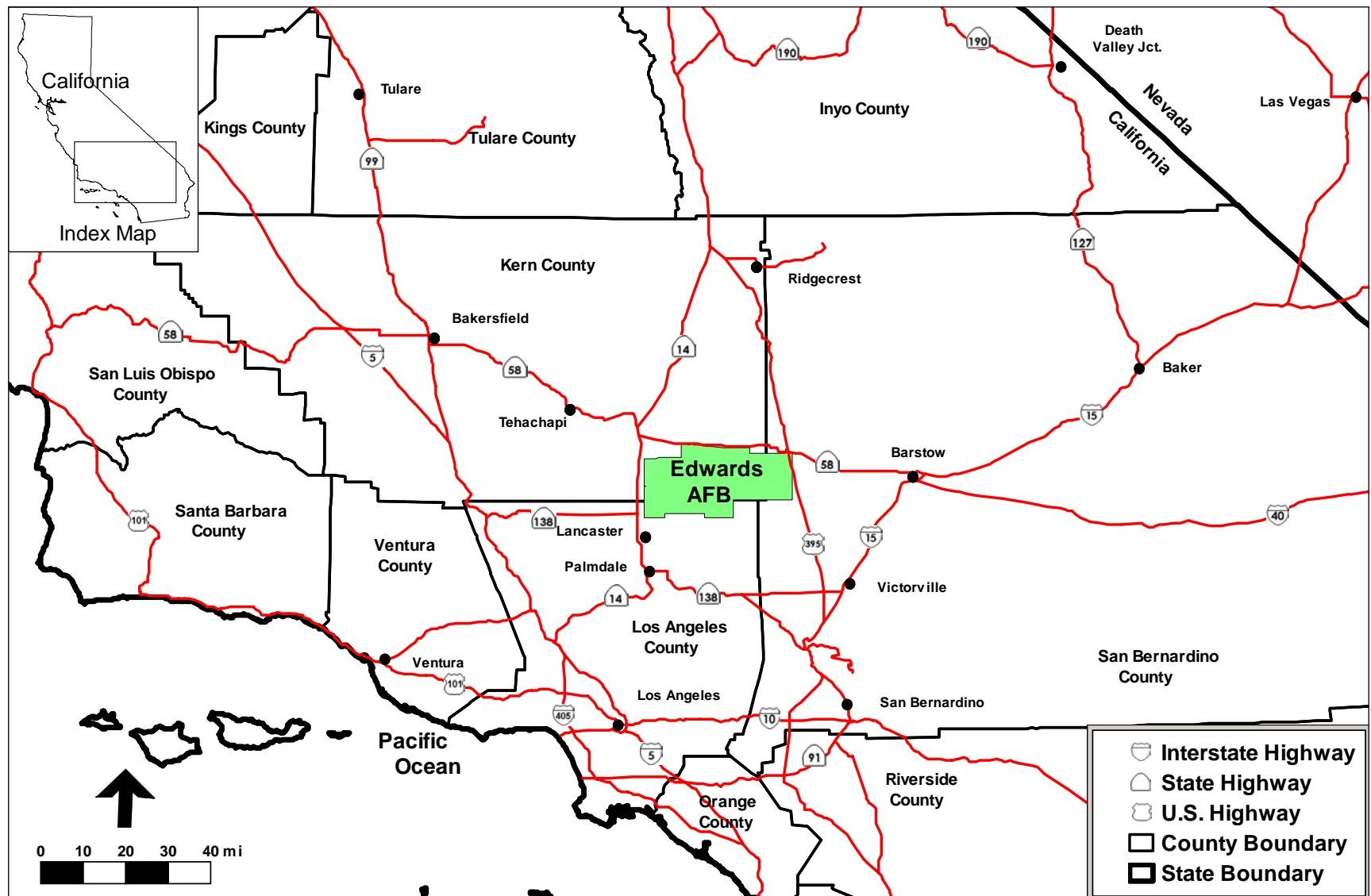


Figure 1 General Vicinity Map

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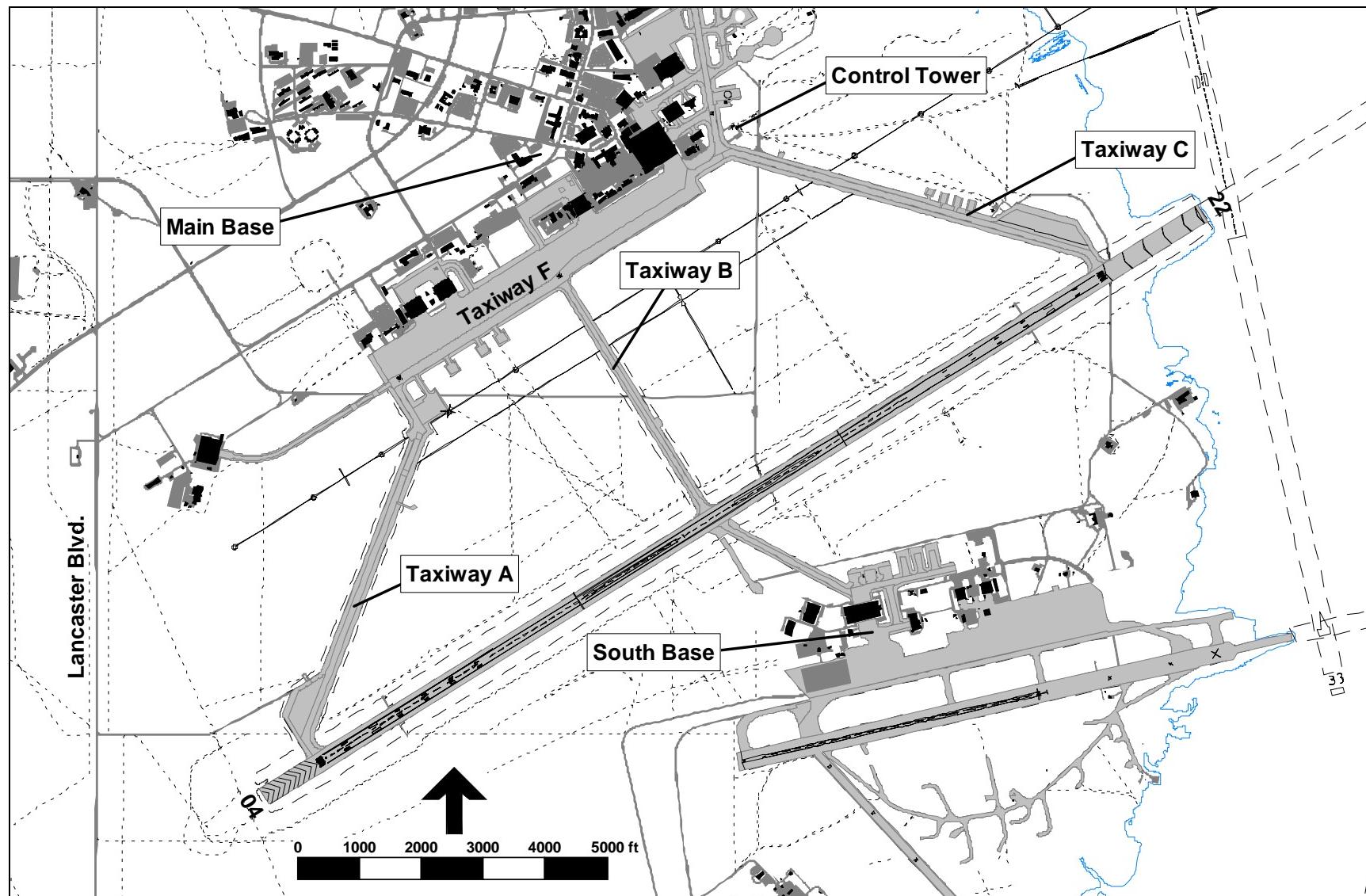


Figure 2 Project Location Map

1.4 Issues and Concerns

1.4.1 Issues and Concerns Studied in Detail

During the analysis process, the following issues and concerns were identified as requiring assessment when considering the potential environmental impacts of the alternatives.

- a. Land Use – Proposed project activities are located in the Main Base Flightline area. The runway location is consistent with current and future Land Use designations. The proposed project would reduce the potential for FOD hazards resulting from the poor condition and continuing deterioration of the current runway.
- b. Air Quality – The proposed project would generate ozone (O_3) precursor compounds (i.e., volatile organic compounds [VOCs] and oxides of nitrogen [NO_x]), primarily from the combustion of fuel in construction equipment, vehicles, and from construction and operation of the batch plants. In addition, the proposed project would generate particulate matter (PM) from earthwork activities; demolition/construction activities; equipment and vehicle use; and batch plant construction and operations.
- c. Water Resources – Runway construction/replacement activities have the potential to affect stormwater drainage patterns. Proposed project activities are not anticipated to affect groundwater quantity or quality.
- d. Safety and Occupational Health – Elements of the existing environment can pose short-term health and safety issues during runway construction/replacement activities. Project personnel have the potential to be exposed to hazardous noise levels as well as lead-, chromium-, or other heavy metal-based paints during runway demolition activities. Project personnel also have the potential for exposure to contaminants from Environmental Restoration Program (ERP) site disturbances during Runway 04/22 demolition and reconstruction activities.
- e. Hazardous Materials and Waste – Runway construction/replacement activities require the proper use, handling, transportation, and storage of hazardous materials and hazardous waste to prevent human exposure and environment contamination. Substantial amounts of solid waste (including recyclable waste) would be generated during Runway 04/22 demolition activities that would require disposal or recycling.
- f. Biological Resources – The proposed project is located within a highly disturbed halophytic phase saltbush scrub community. Therefore, loss of desert tortoise habitat is not expected to occur from project activities. Ground-disturbing activities at the project site have the potential to impact burrowing owls (*Athene cunicularia*) and alkali Mariposa lily (*Calochortus striatus*).
- g. Cultural Resources – Runway construction/replacement activities have the potential to impact historic archaeological resources.
- h. Geology and Soils – The proposed project has the potential to cause soil erosion during construction/replacement activities. Digging in or adjacent to ERP sites may disturb ongoing or future remediation activities. Fill material required for project activities would be acquired from an approved off-Base location. Therefore, fill material issues are not addressed in this assessment.

- i. Socioeconomics – The proposed construction/replacement activities would generate substantial revenue into the local economy, resulting in a positive impact. Proposed project activities would not have an impact on the Base population, employment, housing, and/or schools. Base operations are not expected to increase as a result of this project.
- j. Infrastructure – During construction/replacement activities, the potential exists for traffic problems associated with the transportation of material and equipment. Utility lines could be accidentally severed and service interrupted during construction/replacement activities.

1.4.2 Issues and Concerns Eliminated from Detailed Study

The following issues and concerns were initially considered, but subsequently eliminated from further consideration in the EA.

- a. Environmental Justice and Protection of Children – The Executive Orders (EOs) on environmental justice and the protection of children require Federal agencies to identify and address disproportionately high adverse effects of its activities on minority and low-income populations and children. This action has been reviewed IAW EO 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, and EO 13045, *Protection of Children from Environmental Health and Safety Risks*. Given that the repair and/or reconstruction of Runway 04/22 would occur entirely on Base, the United States Air Force (USAF) has determined that this action has no substantial disproportionate impacts to minority, low-income populations, and/or children.
- b. Energy Resources – Public Law (PL) 102-486, *Energy Policy Act of 1992*, requires Federal entities to identify and accomplish all energy and water conservation measures with a payback of less than 10 years. Executive Order 13123, *Greening of the Government through Efficient Energy Management*, identifies the Department of Energy as the lead agency responsible for implementing the Act and establishes seven goals regarding energy use that are applicable to Federal agencies. This action has been reviewed IAW PL 102-486 and EO 13123, and the USAF has determined that this action has no impact on energy resources as related to these directives.

1.5 Regulatory Requirements, Permits, and Approvals

1.5.1 Regulatory Requirements

This EA has been prepared in order to comply with NEPA and CEQ regulations implementing NEPA. This document is intended to fulfill the requirements for compliance with Title 40 CFR Parts 1500–1508 and AFI 32-7061, *The Environmental Impact Analysis Process*, the applicable AFI for implementing NEPA. Air Force Instruction 32-7061 completely adopts Title 32 CFR Part 989, *Environmental Impact Analysis Process (EIAP)*.

1.5.2 Permits and Approvals

The contractor/proponent performing the work is responsible for obtaining all relevant permits and accomplishing any required notification. Environmental permitting requirements for all work on Base are coordinated through Environmental Management (EM). The following permits have been identified as being required for this project. Depending upon future regulatory changes, other permit not identified in this document may also be required.

- a. An authority to construct (ATC) and a permit to operate (PTO) from the Kern County Air Pollution Control District (KCAPCD) shall be required for the construction and operation of batch plants and any other stationary sources associated with the proposed project.
- b. Air quality permits from the KCAPCD are required for construction and operation of stationary construction equipment (e.g., generators, air compressors, and welders) exceeding 50 brake horsepower (bhp) and remaining on Base for more than 45 days.
- c. If unpermitted stationary construction equipment (e.g., generators, air compressors, welders) exceeding 50 bhp remain on Base less than 45 days and emit less than 2 tons per year of any air contaminant, the equipment must have a written exemption from the Kern County Air Pollution Control Officer.
- d. An AFFTC IMT 5926, *Edwards AFB Civil Engineering Work Clearance Request* (Digging Permit), is required for any trenching or digging operations that extend 12 or more inches below the ground's surface.

1.6 Related Environmental Documents

A number of related environmental documents have been previously prepared and approved that address activities related to project activities. These documents contain information used in the preparation of this EA. These documents include:

- a. *Edwards Air Force Base General Plan* (AFFTC 2001).
- b. *Abbreviated Environmental Assessment for the South Base Runway Rehabilitation Project, PN 94229* (AFFTC 1996a).
- c. *Programmatic Environmental Assessment for Routine Flightline Activities, Edwards Air Force Base, California* (AFFTC 1997).
- d. *Programmatic Environmental Assessment for Road Repair Projects* (AFFTC 1994).
- e. *Environmental Assessment for the Relocation of United States Marine Corps Helicopter Squadrons to Edwards Air Force Base, California* (AFFTC 1999c).

1.7 Future Use of this Document

Future proposed actions documented on an AF Form 813, *Request for Environmental Impact Analysis*, would be reviewed and evaluated to determine if the future action falls within the scope of this EA. In the event that a future action is determined to fall within the scope of this EA, and no new environmental impacts would occur as a result of the future action, a categorical exclusion (CATEX) could be prepared upon submittal of the AF Form 813. A CATEX could also be prepared for future actions that would result in additional minor impacts not discussed in

this EA, if impacts can be reduced to insignificant levels through minimization measures. In some cases, a supplement to this EA might be required. In that case, a new Finding of No Significant Impact (FONSI) would be required. Future actions that are found to result in significant impacts to the environment that cannot be minimized to a level of insignificance would need to be addressed in an Environmental Impact Statement and a Record of Decision.

1.8 Organization of this Environmental Assessment

This EA consists of seven sections and one appendix and are summarized accordingly.

- a. Section 1.0, Introduction – Describes the underlying purpose and need for the proposed action.
- b. Section 2.0, Description of the Proposed Action and Alternatives – Describes the alternatives and summarizes the alternative analysis, including the environmental consequences of the alternatives.
- c. Section 3.0, Affected Environment – Describes the existing (affected) environment at Edwards AFB and the surrounding area.
- d. Section 4.0, Environmental Consequences – Discusses the environmental impact of the proposed action, including any adverse environmental effects that cannot be avoided, the relationship between short-term uses of the human environment and the maintenance and enhancement of long-term productivity including cumulative effects resulting from actions taken, and any irreversible or irretrievable commitment of resources that would be involved in the proposed action.
- e. Section 5.0, References – Provides the references cited throughout the document.
- f. Section 6.0, List of Preparers and Reviewers – Lists the persons who were primarily responsible for preparing and reviewing this EA.
- g. Section 7.0, List of Agencies and Organizations to Whom Copies of the Environmental Assessment Are Sent – lists the various agencies and organizations, to whom copies of the EA are sent.
- h. Appendix A, Air Calculations and Conformity Letter – provides air emission calculations and the air conformity letter.

2.0 DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

This chapter describes Alternative A – Construct a New 12,000-Foot Runway and Demolish and Reconstruct Runway 04/22; Alternative B – Construct a New 15,000-Foot Runway and Abandon Runway 04/22; and Alternative C – the No Action Alternative. In addition, it includes a brief discussion of the alternatives considered but eliminated from further study and a comparative analysis of the impacts of the alternatives.

From a review performed by William R. Quinn, Colonel USAF, Chief, Engineering Division, and a meeting with 95 ABW/CE and USACE on 22 April 2003, specific technical points were agreed upon as being required for a newly constructed or reconstructed runway.

- a. Two maintenance pads, which are in the path of the proposed new runway, would need to be relocated, and an apron/last chance at the end of the new runway would need to be constructed.
- b. No instrument flight regulations (IFR) instrumentation shall be applied to the new runway; the new runway would operate as a visual flight regulations (VFR) runway only.
- c. No approach lighting, localizer, and/or glide slope would be installed on the new runway.
- d. No grooves would be applied to the surface of the new or reconstructed Runway 04/22.
- e. The runway requires:
 - 1) Overrun/underrun, cleared of vegetation and rocks within 1,000 feet of the ends of the runway.
 - 2) Distance remaining markers;
 - 3) Wind socks; and
 - 4) Standard runway and taxiway lights would be the only navigational aids on the new runway.

2.1 Alternative A – Construct a New 12,000-Foot Runway and Demolish and Reconstruct Runway 04/22 (Preferred Alternative)

The AFFTC proposes to construct a new 12,000-foot-long, 200-foot-wide Class B runway approximately 2,500 feet north of the centerline of Runway 04/22 (Figure 3). A total of 2,000 feet of overrun/underrun would also be required to be constructed under this alternative. A batch plant operations area(s) to be used for asphalt and concrete production would be sited, assembled, and operated. Approximately 102,000 tons of material would be required for the 12,000-foot-long, 200-foot-wide runway and 500,000 cubic yards of concrete would be required for the reconstruction of Runway 04/22. Runway 04/22, approximately 15,000 feet long and 300 feet wide, would be demolished and reconstructed. Runway 04/22 would continue to be used during construction of a new 12,000-foot runway. Overhead power lines that are currently located along Lancaster Boulevard would have to be relocated due to their current location being within a mandated clear zone of the proposed 12,000 foot long runway (Figure 4).

Under this alternative, a new 12,000-foot Class B runway would be fully operational prior to demolition/reconstruction activities commencing on Runway 04/22. Construction and demolition/reconstruction activities are anticipated to occur over a 3-year period, from FY06 through FY08.

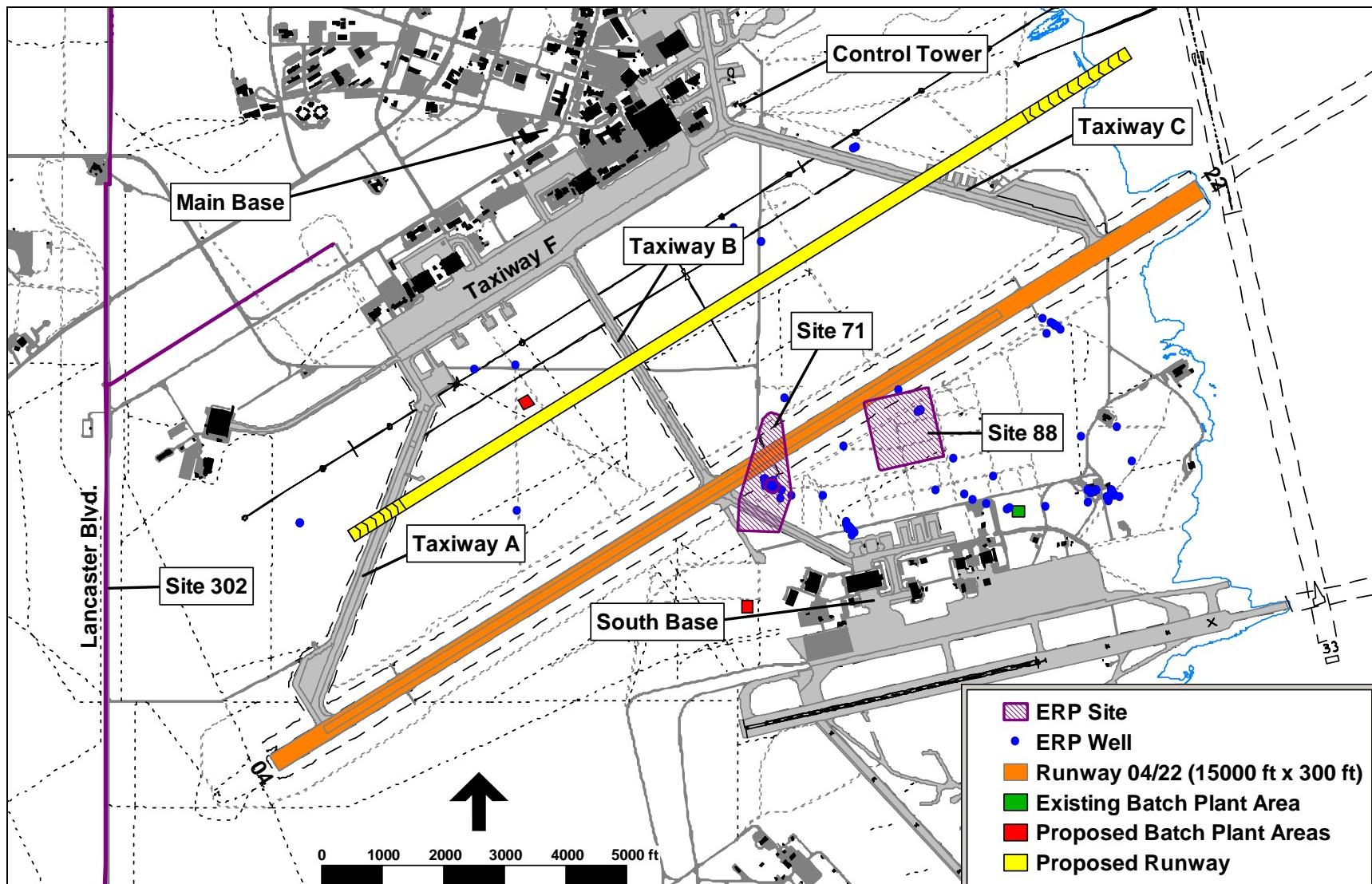


Figure 3 Alternative A Project Map

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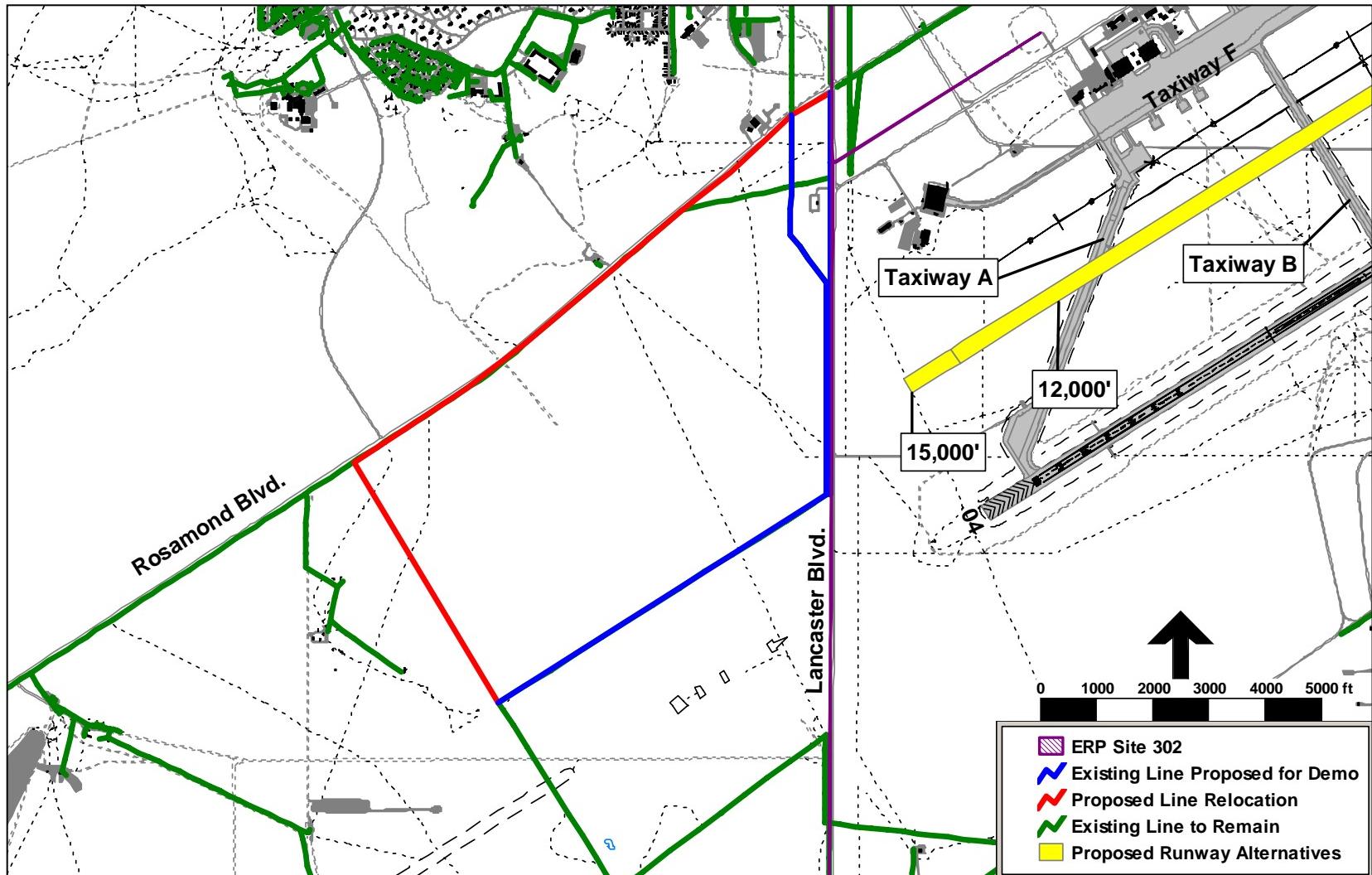


Figure 4 Overhead Electrical Line Relocation Project Map

2.2 Alternative B – Construct a New 15,000-Foot Runway and Abandon Runway 04/22

Under this alternative, a new 15,000-foot-long, 300-foot-wide Class B runway would be constructed between existing Runway 04/22 and the current ramp facilities (Figure 5). The 15,000-foot-long runway would be constructed approximately 2,500 feet north of the centerline of Runway 04/22. A batch plant operations area is proposed to be located north of the proposed new runway location. Approximately 300,000 cubic yards of concrete would be required for this alternative. No disruptions in flight operations would occur under this alternative. Runway 04/22 would continue to be used during the construction of a new runway. Runway 04/22 would continue to be used and repaired on an as-needed basis until complete failure once the new 15,000-foot runway is operational. Upon complete runway failure, Runway 04/22 would be decommissioned in-place. Construction activities are expected to take approximately 1 year.

The overhead power lines along Lancaster Boulevard would be located within the clear zone of the new runway. Therefore, overhead utility lines are required to be relocated if this alternative is selected (see Figure 4).

2.3 Alternative C – No Action Alternative

Under this alternative, Runway 04/22 would continue to degrade and FOD-related emergencies would continue to increase. Currently, the runway is swept three times a day. Repairs have been conducted as necessary, but complete failure of the runway is anticipated to occur in FY08. Runway 04/22 would continue to be repaired on an as-needed basis or until complete runway failure occurs, at which time it would be decommissioned in-place.

2.4 Criteria for Selection of a Reasonable Range of Alternatives

The criteria identified in this section establish a minimum set of requirements that must be met in order for an alternative to be considered viable. Those not meeting these minimum requirements have been eliminated from further discussion. The reason(s) why each was eliminated is/are documented in Section 2.5. Alternatives meeting all selection criteria are retained and each is fully analyzed in Section 4, Environmental Consequences, of this EA. The criteria used to select the alternatives discussed in this document are:

- a. Technical
 - 1) Complies with AFI 32-1026, *Planning and Design of Airfields*.
 - 2) Meets the requirements stated in AFJMAN 32-1013(I) (formerly Air Force Regulation [AFR] 86-14), *Airfield and Heliport Planning and Design*.
 - 3) Meets the technical requirements outlined by the USACE.
- b. Operational
 - 1) Provides a safe and reliable takeoff and landing strip.
 - 2) Reduces the potential for FOD hazards to aircraft and their pilots.
 - 3) Provides a runway that would last 40-plus years.

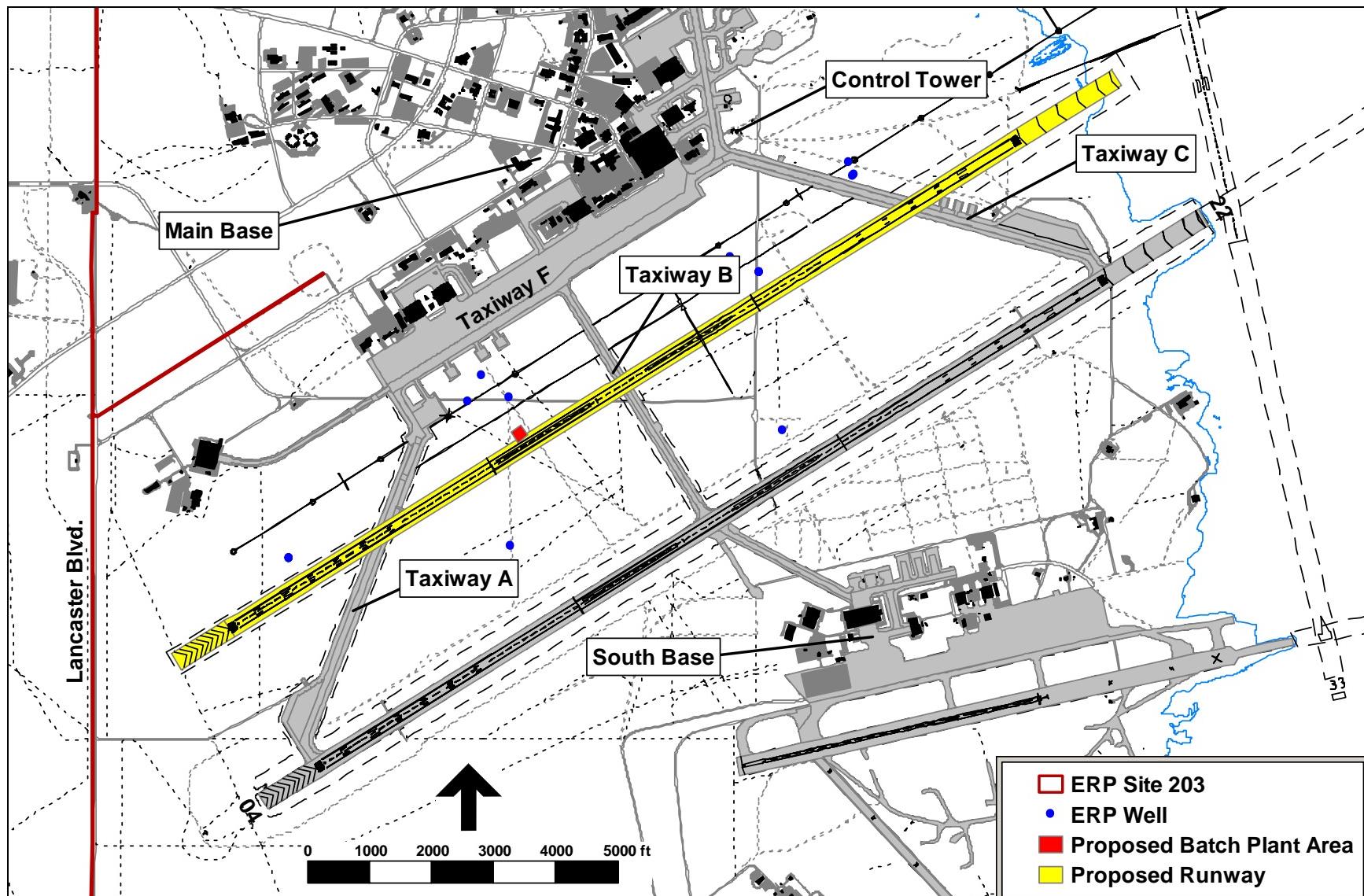


Figure 5 Alternative B Project Map

- 4) Provides a runway that would meet the standards for current and future flight test activities.
 - 5) Repairs and/or replaces Runway 04/22 with minimal interruptions to flight operations.
- c. Economic
- 1) Reduces repair and maintenance costs.
 - 2) Reduces FOD hazards to aircraft and their pilots.
 - 3) Repairs and/or replaces Runway 04/22 with materials with the longest useful life, least maintenance, and lowest cost possible.

2.5 Alternatives Considered but Dismissed from Further Consideration

Eight alternatives were considered and dismissed from further evaluation due to the alternatives either not meeting the need or selection criteria.

- a. The first alternative considered but dismissed was overlaying 12 inches of concrete over the existing runway. Control of the grade created by this additional 12 inches would preclude the use of the overrun/underrun onto Rogers Dry Lake and the existing taxiways. In order to pour the overlay, Runway 04/22 would be shut down for an extended period of time. Fill would be placed on the overrun/underrun areas of Rogers Dry Lake. Significant costs would be incurred under this alternative due to the loss of flight reimbursements while the repairs were being made. At a cost of nearly \$20 million (M) per month, any extended closure of the runway would be very costly. This alternative also would not solve the runway deterioration problem, as the midfield pumping and the ASR problem would still exist. This alternative could also cause the runway to fail earlier than previously anticipated due to the additional weight being placed on the already deteriorating concrete base. Therefore, this alternative has been dismissed from further consideration.
- b. The second alternative considered but dismissed was to mill the top 3 inches of concrete on Runway 04/22. This method would be considered a temporary fix, only intended to treat the FOD generated by deteriorating concrete. It would not eliminate the ASR condition of the underlying concrete and could diminish the structural capacity by removing the top layer of pavement and exposing the internal pore structure to water. Deterioration would continue as the ASR problem would still exist. Runway closure issues would also exist.
- c. The third alternative considered but dismissed was replacing the runway incrementally using regular or quick-dry concrete. Under this alternative, only a limited number of sections would be replaced before the operational area of the runway would be too small to conduct normal flight activities. The process of breaking up and removing the concrete, reworking the base, and pouring and curing the new concrete would take months to accomplish. Therefore, Edwards AFB would not be available as an alternate landing site for the space shuttle orbiter. If Edwards AFB were not available as an alternate landing site and the shuttle orbiter was required to land at White Sands Space Harbor (WSSH), there would be a significant increase in cost and schedule to NASA. In addition to shuttle operations, normal flight operations would either have to be

discontinued during runway repairs or moved to alternate locations for the duration of the repairs. Significant costs would be incurred under this alternative due to the loss of flight reimbursements while the repairs were being made. At a cost of nearly \$20M per month, any extended closure of the runway would be very costly. In addition, Test Pilot School (TPS) operations and NASA requirements for flight research operations would not be met under this alternative.

Quick-drying concrete is approximately twice the cost of regular concrete. This option was also dismissed from further consideration because the use of quick-dry concrete to replace large runway areas has never been done before. Quick-dry concrete is normally used to repair small section of runway or for small repairs. Quick-dry concrete has not been studied sufficiently to determine how long it would last. Due to the chemical processes that occur during curing, the quick-dry concrete could be subject to accelerated cracking.

- d. The fourth alternative considered but dismissed was to apply lithium nitrate to the concrete surface of Runway 04/22. This method would be considered only a temporary fix and has not been field tested or verified. Therefore, this alternative was dismissed from further consideration.
- e. The fifth alternative considered but dismissed was to upgrade the South Base Runway and replace Runway 04/22. Under this alternative, the South Base Runway would be upgraded from 8,000 feet long to 10,000 feet long so that flight operations could continue with minimal disruption as repairs were made to Runway 04/22. Currently, the South Base Runway is intended to be used by light civil aviation type aircraft and is designated as a Class A runway with a weight limit of 12,500 pounds. Future upgrades to this runway, with the intended use by fighter/bomber aircraft, would require reclassification to a Class B runway. Disruptions to normal flight operations could occur. All aircraft assigned to Edwards AFB could operate off a 10,000-foot runway while Runway 04/22 was repaired, although some limitations would exist. The T-38C and the KC-135 require a 15,000-foot long runway length during periods of extreme heat. Therefore, the T-38C and the KC-135E would be limited during periods of extreme heat, as the length of runway required for takeoff during these periods at this altitude is in excess of 10,000 feet. Therefore, this would limit the TPS to early morning flights in the summer, resulting in a maximum of six flights per day. This would extend the time necessary for TPS students to graduate and would result in additional costs. The space shuttle orbiter also requires a runway 15,000 feet long and 300 feet wide to conduct landing operations.

The current Air Traffic Control tower has visual limitations of the South Base Runway from the current location. An additional tower facility would be required to be constructed in order to conduct normal flight test operations. Current airport design criteria do not permit obstructions within 1,000 feet of a Class B runway. An additional 7-foot lateral clearance for every 1-foot vertical is also required. The location and height of the Birk Flight Test Facility (BFTF) as well as the Airborne Laser (ABL) sphere would impact any future runway construction projects at South Base. Prior to repair and construction activities on the South Base Runway, Edwards AFB would be required to obtain a waiver from the obstruction requirements from Air Force Materiel Command/Civil Engineers (AFMC/CE).

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- f. The sixth alternative considered but dismissed was to extend Runway 04/22 approximately 8,500 feet to the east or west or 200 feet to the south, with full repair of Runway 04/22. Extending Runway 04/22 approximately 8,500 feet to the west, across Lancaster Boulevard, would require the relocation of overhead electric lines, realignment of Lancaster Boulevard, and possibly relocating a jet propulsion fuel type 8 (JP-8) fuel line that runs parallel with Lancaster Boulevard. Extending Runway 04/22 approximately 8,500 feet to the east would require extending the actively used portion of Runway 04/22 onto the lakebed. This would cause the asphalt extension to cross Runway 15/33 located on Rogers Dry Lake. This alternative would have significant safety and FOD concerns due to aircraft flying over an active construction area.
- g. The seventh alternative considered but dismissed was to construct a new runway 12,000 feet long, 200 feet wide approximately 1,000 feet north of the centerline of Runway 04/22. This alternative would not meet requirements for NASA's space shuttle orbiter during landing operations and other test aircraft. This alternative would also have significant safety and FOD concerns due to aircraft operating in such close proximity to an active construction area.
- h. The eighth alternative considered but dismissed was to use alternate runways/airfields during runway repair, reconstruction, and/or replacement. Under this alternative, Edwards AFB's operations would be temporarily relocated to one or several alternate locations during the construction phase of this project. Since most AF squadrons are worldwide deployable, a common approach for other bases conducting runway repairs is to shift operations to a Base with similar aircraft. Edwards AFB creates a unique challenge due to the wide variety of aircraft and the need to stay in close proximity to Ridley Mission Control Center (RMCC) and the R-2508 range telemetry system. Deploying operations would have a significant impact on TPS operations.

The research mission of NASA's Dryden Flight Research Center (DFRC) would also be negatively impacted if flight operations were deployed to an alternate location. Relocation of NASA research aircraft poses numerous operational and logistical issues.

If the deployed location were not a military installation, Edwards AFB Security Forces would be required to provide asset security. If the location were another military installation, support would possibly be required to augment the security already at the installation. In either case, to provide additional security support would severely impact the 95th Security Forces' mission capability and would reduce their ability to provide force protection at Edwards AFB. Also, additional provisions and consideration would be required for Special Access Required (SAR) test programs, such as the F/A-22 and Joint Strike Fighter. Other issues related to this alternative would include:

- 1) Numerous support contracts would have to be modified to support a relocation effort. The logistics and costs associated with these required modifications would not be cost effective and would be well outside projected funding authorizations and capabilities.
- 2) Air emissions from deployed aircraft would increase the emissions level that the deployed location currently maintains. In considering other airfields, if the current levels were near the maximum allowed under environmental laws, the only way the location would be considered to be an option is if air emission "credits" were available and could be purchased.

- 3) Edwards AFB would be liable for California State taxes for any fuel consumed in government vehicles used off the installation in traveling to the alternate location. This would create an additional expense that would not be incurred if operations remained at Edwards AFB.
- 4) Flight operations at Edwards AFB must be able to continue with minimal disruption. The feasibility of this option to fulfill this requirement without extreme operational costs is minimal. Although it might be possible to support a limited number of flight operations at deployed locations, this alternative would be unable to support NASA DFRC flight research operations or to provide an emergency/alternate landing site for the space shuttle orbiter.

2.6 Comparison Summary of Alternatives

Table 3 presents a comparison summary of the project description and location for Alternatives A – Preferred Alternative, B, and C – the No Action Alternative. Table 4 presents a comparison of the environmental impacts anticipated as a result of implementing any of the alternatives, including the No Action Alternative.

**TABLE 3
COMPARISON OF ALTERNATIVES**

	ALTERNATIVE A (PREFERRED ALTERNATIVE)	ALTERNATIVE B	ALTERNATIVE C
Title	Construct a New 12,000-Foot-Long, 200-Foot-Wide Runway and Demolish and Reconstruct Runway 04/22	Construct a New 15,000-Foot-Long Runway and Abandon Runway 04/22	No Action Alternative
Location	Approximately 2,500 feet north of the centerline of Runway 04/22 – Main Base.	Approximately 2,500 feet north of the centerline of Runway 04/22 – Main Base.	Runway 04/22 – Main Base
Size	New runway would be 12,000 feet long with an additional 1,000-foot overrun and underrun, for a total of a 14,000-foot-long runway. Runway 04/22 demolition/ reconstruction activities would be conducted in an area approximately 15,000 feet long and 300 feet wide.	New runway would be 15,000 feet long with an additional 1,000-foot overrun and underrun, for a total of a 17,000-foot-long runway.	Not Applicable.

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TABLE 4
SUMMARY OF POTENTIAL ENVIRONMENTAL IMPACTS

ENVIRONMENTAL ISSUE	ALTERNATIVE A – CONSTRUCT A NEW 12,000-FOOT RUNWAY AND DEMOLISH AND RECONSTRUCT RUNWAY 04/22 (PREFERRED ALTERNATIVE)	ALTERNATIVE B – CONSTRUCT A NEW 15,000-FOOT RUNWAY AND ABANDON RUNWAY 04/22	ALTERNATIVE C – NO ACTION ALTERNATIVE
LAND USE <ul style="list-style-type: none"> • Compatibility with the Base General Plan • Foreign Object Damage (FOD) Generation 	<p>The new runway would be compatible with the Base General Plan and all Air Force (AF) and Federal Aviation Administration (FAA) instructions and regulations regarding the design of an airfield. No adverse impacts are anticipated.</p> <p>Minimizations: Compliance with the Base General Plan and all AF and FAA instructions and regulations regarding designing an airfield.</p> <p>A <i>Notice of Proposed Construction or Alteration</i> (FAA Form 7460-1) must be filed with the FAA and approved as not creating an obstacle for aircraft.</p> <p>The proposed project shall obtain final siting approval from the Base Planning and Zoning Committee.</p> <p>The potential for FOD generation exists. No adverse impacts are anticipated.</p> <p>Minimizations: Project personnel shall use standard operating procedures for the prevention of FOD. Contact Airfield Management for FOD reduction guidelines.</p>	<p>The new runway would be compatible with the Base General Plan and all AF and FAA instructions and regulations regarding the design of an airfield. No adverse impacts are anticipated.</p> <p>Minimizations: Compliance with the Base General Plan and all AF and FAA instructions and regulations regarding designing an airfield.</p> <p>A <i>Notice of Proposed Construction or Alteration</i> (FAA Form 7460-1) must be filed with the FAA and approved as not creating an obstacle for aircraft</p> <p>The proposed project shall obtain final siting approval from the Base Planning and Zoning Committee.</p> <p>The potential for FOD generation would exist; however, would be less than Alternative A because Runway 04/22 would not be demolished and reconstructed under this alternative. No adverse impacts are anticipated.</p> <p>Minimizations: Project personnel shall use standard operating procedures for the prevention of FOD. Contact Airfield Management for FOD reduction guidelines.</p>	<p>No change from existing conditions. No adverse impacts are anticipated.</p> <p>Minimizations: None required.</p> <p>Runway 04/22 would continue to degrade and FOD-related emergencies would continue to increase.</p> <p>Minimizations: Project personnel shall continue to use standard operating procedures for the prevention of FOD. Contact Airfield Management for FOD reduction guidelines.</p>

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TABLE 4 (Continued)
SUMMARY OF POTENTIAL ENVIRONMENTAL IMPACTS

ENVIRONMENTAL ISSUE	ALTERNATIVE A – CONSTRUCT A NEW 12,000-FOOT RUNWAY AND DEMOLISH AND RECONSTRUCT RUNWAY 04/22 (PREFERRED ALTERNATIVE)	ALTERNATIVE B – CONSTRUCT A NEW 15,000-FOOT RUNWAY AND ABANDON RUNWAY 04/22	ALTERNATIVE C – NO ACTION ALTERNATIVE
AIR QUALITY <ul style="list-style-type: none"> • Tons and types of pollutants generated • Regionally significant • Permits required 	<p>Increased air emissions would occur during construction. Total emissions during construction and demolition/reconstruction activities during the peak construction years (second and third years of proposed project), of approximately 6.7 tons per year volatile organic compounds (VOCs) and 66.0 tons per year oxides of nitrogen (NO_x) would be generated. Hazardous air pollutants (HAPs) would also be generated during runway construction and Runway 04/22 demolition and reconstruction. Construction and demolition/reconstruction activities are expected to occur over a 3-year period. No long-term adverse impacts to air resources are anticipated.</p> <p><u>Minimizations:</u> Compliance with all applicable rules and regulations listed in Section 3.2.1.</p> <p>No</p> <p>Air quality operational permits are required for construction equipment exceeding 50 brake horsepower (bhp) and remaining on Base more than 45 days. A written exemption would be required if on Base less than 45 days.</p> <p>An authority to construct (ATC) and a permit to operate (PTO) from the Kern County Air Pollution Control District (KCAPCD) would be required for construction and operation of batch plants.</p>	<p>Increased air emissions would occur during construction. Total emissions during construction and replacement activities during the peak construction years of FY07 and FY08 are 6.7 tons per year of VOCs and 66.0 tons per year of NO_x would be generated. Hazardous air pollutants would also be generated during runway construction. Construction activities are expected to occur over a 2-year period. No long-term adverse impacts to air resources are anticipated.</p> <p><u>Minimizations:</u> Compliance with all applicable rules and regulations listed in Section 3.2.1.</p> <p>No</p> <p>Air quality operational permits are required for construction equipment exceeding 50 bhp and remaining on Base more than 45 days. A written exemption would be required if on Base less than 45 days.</p> <p>An ATC and a PTO from the KCAPCD would be required for construction and operation of batch plants.</p>	<p>There would be no change in current air quality emissions from current conditions.</p> <p><u>Minimizations:</u> No new measures are required.</p> <p>No</p> <p>No permits are required for this alternative.</p>

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TABLE 4 (Continued)
SUMMARY OF POTENTIAL ENVIRONMENTAL IMPACTS

ENVIRONMENTAL ISSUE	ALTERNATIVE A – CONSTRUCT A NEW 12,000-FOOT RUNWAY AND DEMOLISH AND RECONSTRUCT RUNWAY 04/22 (PREFERRED ALTERNATIVE)	ALTERNATIVE B – CONSTRUCT A NEW 15,000-FOOT RUNWAY AND ABANDON RUNWAY 04/22	ALTERNATIVE C – NO ACTION ALTERNATIVE
AIR QUALITY (Concluded)	<u>Minimizations:</u> Emission sources that require modification shall be reevaluated before any work can begin. All mechanical equipment shall be kept in working order according to applicable Technical Orders and maintenance manuals to reduce emissions to acceptable levels. All construction equipment and vehicles shall comply with applicable emission standards for 1996 or newer engines.	<u>Minimizations:</u> Emission sources that require modification shall be reevaluated before any work can begin. All mechanical equipment shall be kept in working order according to applicable Technical Orders and maintenance manuals to reduce emissions to acceptable levels. All construction equipment and vehicles shall comply with applicable emissions standards for 1996 or newer engines.	<u>Minimizations:</u> None required.
WATER RESOURCES <ul style="list-style-type: none"> • Quality of stormwater runoff 	Construction/demolition debris or hazardous materials have the potential to be introduced into the stormwater drainage system. No adverse impacts are anticipated. <u>Minimizations:</u> Project activities should follow the procedures and controls outlined in the <i>Stormwater Pollution Prevention Plan (SWPPP) Edwards Air Force Base</i> (Air Force Flight Test Center [AFFTC] 1998). The proposed project shall comply with Air Force Flight Test Center Instruction (AFFTCI) 32-6, <i>Edwards AFB Wastewater Instruction</i> .	Construction debris or hazardous materials have the potential to be introduced into the stormwater drainage system. No adverse impacts are anticipated. <u>Minimizations:</u> Project activities should follow the procedures and controls outlined in the <i>Stormwater Pollution Prevention Plan (SWPPP) Edwards Air Force Base</i> (Air Force Flight Test Center [AFFTC] 1998). The proposed project shall comply with AFFTCI 32-6, <i>Edwards AFB Wastewater Instruction</i> .	No change from existing conditions. No adverse impacts are anticipated. <u>Minimizations:</u> None required.

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TABLE 4 (Continued)
SUMMARY OF POTENTIAL ENVIRONMENTAL IMPACTS

ENVIRONMENTAL ISSUE	ALTERNATIVE A – CONSTRUCT A NEW 12,000-FOOT RUNWAY AND DEMOLISH AND RECONSTRUCT RUNWAY 04/22 (PREFERRED ALTERNATIVE)	ALTERNATIVE B – CONSTRUCT A NEW 15,000-FOOT RUNWAY AND ABANDON RUNWAY 04/22	ALTERNATIVE C – NO ACTION ALTERNATIVE
SAFETY AND OCCUPATIONAL HEALTH <ul style="list-style-type: none"> Potential for exposure to lead-based paint 	<p>Lead-based paint could be encountered during Runway 04/22 demolition activities. No adverse impacts are anticipated.</p> <p><u>Minimizations:</u> Project activities shall comply with the standards, instructions, and regulations listed in Section 3.4.1 applicable to the proposed action.</p> <p>Any lead-based paint that has the potential to be disturbed as a result of implementing the proposed action must first be abated by qualified and trained lead-based paint workers as defined in Title 8 California Code of Regulations (CCR) 1532.1 and Title 29 Code of Federal Regulations (CFR) 1926.62.</p> <p>The contractor shall be registered with California Occupational Safety and Health Administration (Cal-OSHA) prior to implementing lead-based paint abatement activities.</p> <p>Prior to abatement activities, the contractor shall submit an Abatement and Disposal Plan to Civil Engineering and EM for coordination and approval.</p>	<p>The potential for lead-based paint exposure does not exist under this alternative as Runway 04/22 would not be demolished.</p> <p><u>Minimizations:</u> None required.</p>	<p>No change from existing conditions.</p> <p><u>Minimizations:</u> None required.</p>

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TABLE 4 (Continued)
SUMMARY OF POTENTIAL ENVIRONMENTAL IMPACTS

ENVIRONMENTAL ISSUE	ALTERNATIVE A – CONSTRUCT A NEW 12,000-FOOT RUNWAY AND DEMOLISH AND RECONSTRUCT RUNWAY 04/22 (PREFERRED ALTERNATIVE)	ALTERNATIVE B – CONSTRUCT A NEW 15,000-FOOT RUNWAY AND ABANDON RUNWAY 04/22	ALTERNATIVE C – NO ACTION ALTERNATIVE
SAFETY AND OCCUPATIONAL HEALTH (Concluded) <ul style="list-style-type: none"> Potential for exposure to Environmental Restoration Program (ERP) site contamination Potential for exposure to hazardous noise levels 	<p>Project activities would occur within ERP Sites 71, 88, and 302. Trenching or digging in ERP sites may result in encountering contaminated soil. No adverse impacts are anticipated.</p> <p><u>Minimizations:</u> A Health and Safety Plan (HASP) may be required for activities conducted in these ERP sites. Contact Bioenvironmental Engineering regarding HASP concerns.</p> <p>Project activities are located adjacent to the Main Base Flightline. No adverse impacts are anticipated.</p> <p><u>Minimizations:</u> All personnel present within hazardous noise areas shall follow applicable hearing protection guidelines.</p>	<p>Project activities would occur within ERP Site 302. Trenching or digging in an ERP site may result in encountering contaminated soil. No adverse impacts are anticipated.</p> <p><u>Minimizations:</u> A HASP may be required for activities conducted in this ERP site. Contact Bioenvironmental Engineering regarding HASP concerns.</p> <p>Project activities are located adjacent to the Main Base Flightline. No adverse impacts are anticipated.</p> <p><u>Minimizations:</u> All personnel present within hazardous noise areas shall follow applicable hearing protection guidelines.</p>	<p>No change from existing conditions.</p> <p><u>Minimizations:</u> None required.</p> <p>No change from existing conditions.</p> <p><u>Minimizations:</u> None required.</p>
HAZARDOUS MATERIALS AND WASTE <ul style="list-style-type: none"> Type and amount of hazardous materials used 	<p>The amount and type of hazardous materials used would be similar to those already used on Edwards AFB. No adverse impacts are anticipated.</p>	<p>The amount and type of hazardous materials used would be similar to those already used on Edwards AFB. No adverse impacts are anticipated.</p>	<p>No change from existing conditions.</p>

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TABLE 4 (Continued)
SUMMARY OF POTENTIAL ENVIRONMENTAL IMPACTS

ENVIRONMENTAL ISSUE	ALTERNATIVE A – CONSTRUCT A NEW 12,000-FOOT RUNWAY AND DEMOLISH AND RECONSTRUCT RUNWAY 04/22 (PREFERRED ALTERNATIVE)	ALTERNATIVE B – CONSTRUCT A NEW 15,000-FOOT RUNWAY AND ABANDON RUNWAY 04/22	ALTERNATIVE C – NO ACTION ALTERNATIVE
HAZARDOUS MATERIALS AND WASTE (Concluded) <ul style="list-style-type: none"> • Type and amount of hazardous wastes generated • Construction/demolition waste generation 	<u>Minimizations:</u> The contractor shall comply with all applicable Federal, State, and local laws and regulations. The amount and type of hazardous wastes generated would be similar to those already generated on Edwards AFB. No adverse impacts are anticipated. <u>Minimizations:</u> The contractor shall comply with all applicable Federal, State, and local laws and regulations. Approximately 150,000 tons of construction/demolition waste would be generated through construction activities and demolition/reconstruction of Runway 04/22. No adverse impacts to regional waste facilities are anticipated. <u>Minimizations:</u> Solid waste shall be transported to a State-licensed facility.	<u>Minimizations:</u> The contractor shall comply with all applicable Federal, State, and local laws and regulations. The amount and type of hazardous wastes generated would be similar to those already generated on Edwards AFB. No adverse impacts are anticipated. <u>Minimizations:</u> The contractor shall comply with all applicable Federal, State, and local laws and regulations. Minimal construction waste would be generated through construction of a new runway. No adverse impacts to regional waste facilities are anticipated. <u>Minimizations:</u> Solid waste shall be transported to a State-licensed facility.	<u>Minimizations:</u> None required. No change from existing conditions. <u>Minimizations:</u> None required. No change from existing conditions. <u>Minimizations:</u> None required.

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TABLE 4 (Continued)
SUMMARY OF POTENTIAL ENVIRONMENTAL IMPACTS

ENVIRONMENTAL ISSUE	ALTERNATIVE A – CONSTRUCT A NEW 12,000-FOOT RUNWAY AND DEMOLISH AND RECONSTRUCT RUNWAY 04/22 (PREFERRED ALTERNATIVE)	ALTERNATIVE B – CONSTRUCT A NEW 15,000-FOOT RUNWAY AND ABANDON RUNWAY 04/22	ALTERNATIVE C – NO ACTION ALTERNATIVE
BIOLOGICAL RESOURCES <ul style="list-style-type: none"> Potential exists to impact alkali Mariposa lily and nesting sites of ground-dwelling birds 	<p>Ground-disturbing activities have the potential to impact alkali Mariposa lily and disturb burrowing owl nesting sites.</p> <p><u>Minimizations:</u> Ground-disturbing activities should be planned during non-nesting periods, generally between October and February. A depredation permit is required to remove a bird or an active bird nest. A 95th Air Base Wing/Environmental Management (95 ABW/EM) representative shall perform any removal of birds or nests.</p>	<p>Ground-disturbing activities have the potential to impact alkali Mariposa lily and disturb burrowing owl nesting sites.</p> <p><u>Minimizations:</u> Ground-disturbing activities should be planned during non-nesting periods, generally between October and February. A depredation permit is required to remove a bird or an active bird nest. A 95th Air Base Wing/Environmental Management (95 ABW/EM) representative shall perform any removal of birds or nests.</p>	<p>No change from existing conditions.</p> <p><u>Minimizations:</u> None required.</p>
CULTURAL RESOURCES <ul style="list-style-type: none"> Potential exists for project to adversely affect four historic-period archaeological sites and one prehistoric archaeological site. 	<p>If mitigation measures are implemented, no significant adverse impacts are anticipated.</p> <p><u>Mitigations:</u> Prior to runway construction, the township of Muroc and one prehistoric site would require a Phase III mitigation effort. Three historic-period sites would require Phase II evaluations.</p>	<p>If mitigation measures are implemented, no significant adverse impacts are anticipated.</p> <p><u>Mitigations:</u> Prior to runway construction, the township of Muroc and one prehistoric site would require a Phase III mitigation effort. Three historic-period sites would require Phase II evaluations.</p>	<p>No change from existing conditions.</p> <p><u>Mitigations:</u> None required.</p>

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TABLE 4 (Continued)
SUMMARY OF POTENTIAL ENVIRONMENTAL IMPACTS

ENVIRONMENTAL ISSUE	ALTERNATIVE A – CONSTRUCT A NEW 12,000-FOOT RUNWAY AND DEMOLISH AND RECONSTRUCT RUNWAY 04/22 (PREFERRED ALTERNATIVE)	ALTERNATIVE B – CONSTRUCT A NEW 15,000-FOOT RUNWAY AND ABANDON RUNWAY 04/22	ALTERNATIVE C – NO ACTION ALTERNATIVE
GEOLOGY AND SOILS <ul style="list-style-type: none"> • Soil disturbance/erosion • ERP Equipment Disturbance 	<p>Site preparation, grading, and construction activities may disturb soil surfaces; short-term erosion may occur when soils become exposed to high winds, heavy rains, or vehicular and equipment use. No adverse impacts are anticipated.</p> <p><u>Minimizations:</u> Ground-disturbing activities should be delayed during high-wind conditions (in excess of 25 miles per hour [mph]).</p> <p>Vehicular traffic, grading, and digging should not be permitted in the project area during high-wind conditions.</p> <p>Exposed surfaces should be periodically sprayed with water.</p> <p>Project activities have the potential to damage ERP monitoring wells and underground lines. No adverse impacts are anticipated.</p> <p><u>Minimizations:</u> Prior to starting work on the project, proponent/contractor shall contact EM to identify the location of ERP equipment. Damage to this equipment must be avoided.</p>	<p>Site preparation, grading, and construction activities may disturb soil surfaces; short-term erosion may occur when soils become exposed to high winds, heavy rains, or vehicular and equipment use. No adverse impacts are anticipated.</p> <p><u>Minimizations:</u> Ground-disturbing activities should be delayed during high-wind conditions (in excess of 25 mph).</p> <p>Vehicular traffic, grading, and digging should not be permitted in the project area during high-wind conditions.</p> <p>Exposed surfaces should be periodically sprayed with water.</p> <p>Project activities have the potential to damage ERP monitoring wells and underground lines. No adverse impacts are anticipated.</p> <p><u>Minimizations:</u> Prior to starting work on the project, proponent/contractor shall contact EM to identify the location of ERP equipment. Damage to this equipment must be avoided.</p>	<p>No change from existing conditions.</p> <p><u>Minimizations:</u> None required.</p> <p>No change from existing conditions.</p> <p><u>Minimizations:</u> None required.</p>

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TABLE 4 (Concluded)
SUMMARY OF POTENTIAL ENVIRONMENTAL IMPACTS

ENVIRONMENTAL ISSUE	ALTERNATIVE A – CONSTRUCT A NEW 12,000-FOOT RUNWAY AND DEMOLISH AND RECONSTRUCT RUNWAY 04/22 (PREFERRED ALTERNATIVE)	ALTERNATIVE B – CONSTRUCT A NEW 15,000-FOOT RUNWAY AND ABANDON RUNWAY 04/22	ALTERNATIVE C – NO ACTION ALTERNATIVE
SOCIOECONOMICS			
<ul style="list-style-type: none"> • Generation of revenue into the local economy 	<p>Incremental benefit would be realized through funds spent in nearby communities. Total project is estimated at approximately \$106 million (M).</p> <p><u>Minimizations:</u> None required.</p>	<p>Incremental benefit would be realized through funds spent in nearby communities. Total project is estimated at approximately \$105M.</p> <p><u>Minimizations:</u> None required.</p>	<p>No change from existing conditions.</p> <p><u>Minimizations:</u> None required</p>
INFRASTRUCTURE			
<ul style="list-style-type: none"> • Construction equipment and materials to and from the project site have the potential to impact existing traffic patterns 	<p>Minor, short-term traffic congestion is expected when large, slow-moving vehicles travel on access roads through the Base. No adverse impacts are anticipated.</p> <p><u>Minimizations:</u> Traffic routes should be limited.</p>	<p>Minor, short-term traffic congestion is expected when large, slow-moving vehicles travel on access roads through the Base. No adverse impacts are anticipated.</p> <p><u>Minimizations:</u> Traffic routes should be limited.</p>	<p>No change from existing conditions.</p> <p><u>Minimizations:</u> None required.</p>
<ul style="list-style-type: none"> • Temporary closure of roadways or rerouting of traffic may be required 	<p>Any required road closure or rerouting of traffic would be expected to be temporary. No adverse impacts are anticipated.</p> <p><u>Minimizations:</u> All work affecting closure, rerouting, or other modification of roadways or streets shall be coordinated with the Security Forces, Fire Department, and Public Affairs Office.</p>	<p>Any required road closure or rerouting of traffic would be expected to be temporary. No adverse impacts are anticipated.</p> <p><u>Minimizations:</u> All work affecting closure, rerouting, or other modification of roadways or streets shall be coordinated with the Security Forces, Fire Department, and Public Affairs Office.</p>	<p>No change from existing conditions.</p> <p><u>Minimizations:</u> None required.</p>
<ul style="list-style-type: none"> • Potential for interruption of utility services 	<p>Damage to existing utility lines within the project area could occur through accidental severance during earth-moving activities and would result in an interruption of service. No adverse impacts are anticipated if activities are coordinated.</p> <p><u>Minimizations:</u> Coordinate digging permit through Civil Engineering.</p>	<p>Damage to existing utility lines within the project area could occur through accidental severance during earth-moving activities and would result in an interruption of service. No adverse impacts are anticipated.</p> <p><u>Minimizations:</u> Coordinate digging permit through Civil Engineering.</p>	<p>No change from existing conditions.</p> <p><u>Minimizations:</u> None required.</p>

3.0 AFFECTED ENVIRONMENT

This section describes the relevant resources at Edwards AFB that may be impacted by any of the action alternatives if they were implemented. This chapter establishes the baseline against which the decision maker and the public can compare the effects of all action alternatives. The following attributes comprise the existing environment: Land Use, Air Quality, Water Resources, Safety and Occupational Health, Hazardous Materials and Waste, Biological Resources, Cultural Resources, Geology and Soils, Socioeconomics, and Infrastructure. These elements are described in the following sections.

3.1 Land Use

Land may be used for a variety of uses including residential, industrial, commercial, agricultural, recreational, and military. Specialized land uses may include radio transmission areas, bombing/missile ranges, wildlife preserves, explosive ordnance ranges, and airfields. The *Edwards Air Force Base General Plan* (AFFTC 2001) presents the official position on long-range development at Edwards AFB. This Plan establishes the goals, policies, plans, and anticipated actions regarding the physical, social, and economic environment.

The proposed project is located within the Main Base Flightline area within a moderately disturbed area. This area has a land use designation as “developed;” however, natural vegetation has been encouraged around the perimeter of Runway 04/22 in order to discourage foraging by horned larks and other ground-dwelling birds. Horned larks are ground-dwelling birds that have been identified in the Bird Aircraft Strike Hazard (BASH) Plan as species that may interfere with aircraft safety. The Base General Plan states: “There is a proposal to construct a replacement runway parallel to the Main Runway (04/22). The new runway could be built between Runway 04/22 and the parking ramp. This site would not necessitate relocating the Tower Fly-By-Line.”

3.1.1 Regulatory Requirements/Guidance

Air Force Instruction 32-1026, *Planning and Design of Airfields*, provides guidance to personnel responsible for planning, developing, siting, and the layout of runways, taxiways, aprons, pads, and support facilities for fixed- and rotary-winged aircraft. This Instruction provides references to the documents that contain the criteria and standards for these facilities and establishes a waiver process for deviations from these criteria and standards.

Air Force Instruction 32-7062, *Air Force Comprehensive Planning*, contains the responsibilities and requirements for comprehensive planning and describes the procedures for developing, implementing, and maintaining the Comprehensive Plan within the installation.

Air Force Instruction 32-7063, *Air Installation Compatible Use Zone Program*, identifies the requirements to develop, implement, and maintain the Air Installation Compatible Use Zone (AICUZ) program. This Instruction applies to all AF installations with active runways located in the United States and its territories, including Government-owned, contractor-operated facilities.

Air Force Joint Manual 32-1013(I), *Airfield and Heliport Planning and Design*, provides standardized airfield, heliport, and airspace criteria for the geometric layout, design, and

construction of runways, helipads, taxiways, aprons, and related permanent facilities to meet sustained operations.

Air Force Joint Manual 32-1038, *Procedures for US Army and US Air Force Airfield Pavement Condition Surveys*, provides procedures for performing pavement condition surveys at all airfields with present or potential Army or Air Force missions. It is intended for use by all personnel responsible for such surveys of pavement condition. Specific objectives of a condition survey are to determine present conditions of the pavement in terms of apparent structural integrity and operational surface condition, to provide a common index for comparing the condition and performance of pavements at all air stations along with a rational basis for justification of pavement repair projects, and provide feedback on pavement performance for validation and improvement of current pavement design, evaluation, and maintenance procedures.

Air Force Flight Test Center Instruction (AFFTCI) 11-2, *Ground Operations*, applies to all ground agencies in support of aircraft operations at Edwards AFB. In addition, AFJMAN 24-306, *Manual for the Wheeled Vehicle Driver*; AFFTCI 10-2, *Control of Vehicles on the Airfield*; AFI 21-101, *Aerospace Equipment Maintenance Management*; and AFFTCI 11-15, *Scheduling Procedures for Aircraft and Air/Ground Support*, contain procedures, policies, and responsibilities for all aircraft operations on Edwards AFB.

Flight safety hazards from vertical obstructions (e.g., towers) are regulated by the FAA. A *Notice of Proposed Construction or Alteration* (FAA Form 7460-1) must be filed with the FAA and approved as not creating an obstacle for aircraft.

3.1.2 On-Base Land Use

Edwards AFB consists of approximately 301,000 acres in Kern, Los Angeles, and San Bernardino Counties. The Base contains largely undeveloped or semi-improved land that is used to support the flight-testing of a wide variety of military, civilian, and experimental aircraft. The developed portion of the Base includes approximately 6 percent of the total Base area, and is concentrated on the west side of Rogers Dry Lake. The developed areas include Main Base, South Base, North Base, and Air Force Research Laboratory (AFRL). The Base General Plan establishes land use designations for the Base. These land use designations, total acreage, and associated percentage of the Base area is presented in Table 5.

Air Force land use policies and guidance are only applicable to lands under AF control. Policies established for airfields are similar to the criteria established by the FAA for development of surrounding civilian airports. Air Force Joint Manual 32-1013(I), *Airfield and Heliport Planning and Design*, sets the minimum requirements for airfields and applicable land uses for the areas surrounding the airfield. The Edwards AFB Planning and Zoning Committee grants final siting approval for all construction- and activity-related projects as part of the review and approval process.

Edwards AFB has three paved runways that provide the principal landing surfaces for the Base. These runways are divided into two different classes: A and B. The type of aircraft using the runway determines the primary difference between Class A and B runways. Class A runways are primarily used for small, light aircraft. Class B runways are primarily intended for

TABLE 5
EDWARDS AIR FORCE BASE LAND USE DESIGNATIONS

Land Use Designation	Developed Area (Acres)
Airfield Clearance and Explosive Clear Zones	2,636
Airfield Pavements	646
Lakebed Painted Runways	1,667
Lakebed Nonmaintained Landing Site	13,582
Aircraft Operations and Maintenance	597
Engineering Test	1,826
Aircraft Test Ranges	13,654
Industrial	3,418
Administrative	73
Community (Commercial)	160
Community (Service)	213
Medical	70
Housing (Accompanied)	918
Housing (Unaccompanied)	108
Outdoor Recreation	6,580
Buffer Zones	13,823
Water	0.00
Total	59,971

Source: *Edwards Air Force Base General Plan (AFFTC 2001)*

high-performance and large, heavy aircraft. Runway 04/22 is a Class B runway and the primary airstrip for the Base. The North and South Base runways are Class A runways. In addition, the Base has 18 runways painted on the dry lakebeds, and uses the remaining lakebed areas for emergency landings.

Within these various land use designations, specific areas have been set aside for particular purposes. These include, but are not limited to, areas such as the off-road vehicle areas I and II, Combat Arms Range, hunting and fishing areas, Precision Impact Range Area (PIRA), and AFRL (Figure 6).

3.1.2.1 Air Installation Compatible Use Zone

Department of Defense policy is to work toward achieving compatibility between air installations and neighboring civilian communities through the use of compatible land use planning and control processes. The AICUZ Program implements this policy and is defined by Department of Defense Instruction (DODI) 4165.57, *Air Installation Compatible Use Zones*. The AICUZ program for each military air installation consists of land areas upon which certain uses may obstruct the airspace or otherwise be hazardous to aircraft operations, and land areas that are exposed to the health, safety, or welfare hazards of aircraft operations. Air Installation Compatible Use Zone studies define and map aircraft noise contours, runway clear zones, and accident potential zones (APZs) around an installation. The AICUZ program objectives are to assist local, regional, State, and Federal officials in protecting and promoting the public health, safety, and welfare by promoting compatible development within the AICUZ area of influence,

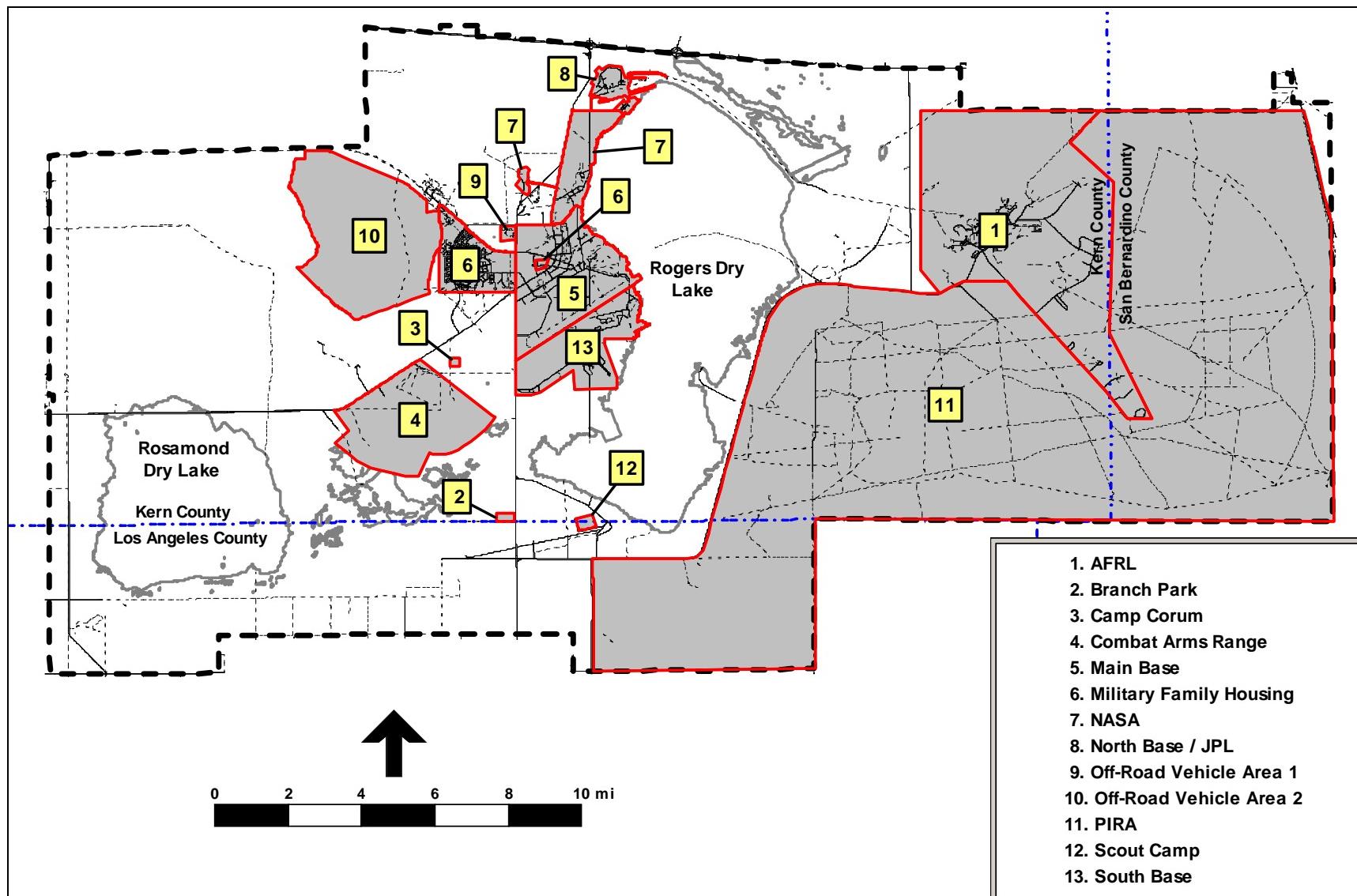


Figure 6 On-Base Land Use Areas

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and to protect Air Force operational capabilities from the effects of land uses that are incompatible with aircraft operations. Within the USAF, the responsibility for implementation of the AICUZ Program is assigned to the major air command, which for Edwards AFB is Headquarters Air Force Materiel Command, located at Wright-Patterson AFB, Ohio.

The AICUZ program implements the required restrictions on the uses and heights of natural and manmade objects in the vicinity of air installations to provide for safety of flight and to ensure that people and facilities are not concentrated in areas susceptible to aircraft accidents. It also implements required restrictions for land development in areas that are subject to aircraft noise and ensures management and control.

Aircraft noise contours are presented in the form on concentric closed curves much like lines of elevation on a topographic map. Lines of equal sound levels provide for an analysis of potential noise impacts on land areas that underlie air traffic flightpaths and that are impacted by engine noise from ground operations. The lowest level of sound that is mapped on a normal noise contour chart is 65 Ldn (day-night equivalent noise level, A-weighted).

Several areas of potential impact on land use are defined by an AICUZ analysis. Clear zones (CZs) are areas on the ground or water beginning at the end of the runway and symmetrical about its center. This zone is to be free of obstacles to protect the safety of approaching aircraft. The CZ for a Class A runway is 1,000 feet wide by 3,000 feet long. The CZ for a Class B runway is 3,000 feet wide by 3,000 feet long.

The APZs are areas at both ends of a runway where the probability of aircraft accidents is highest based upon statistical analysis of past accident data at various Bases (Figure 7). Accident Potential Zones I and II are those areas beyond the clear zone that possess a significant potential for accidents. Each of these zones has certain types of land use restrictions associated with them. The size of each of these APZs is dependent upon a variety of factors and is defined in AFJMAN 32-1013(I), *Airfield and Heliport Planning and Design*. The following types of land uses are generally compatible with APZ I: industrial, agricultural, recreational, and vacant lands. In addition to land uses compatible with APZ I, APZ II land uses can also include low intensity residential and nonresidential uses for a maximum of 20-percent building coverage per acre.

The current airfield noise analysis for Edwards AFB was completed in April 1993 by the Air Force Center for Environmental Excellence (AFCEE). As noted previously, the analysis showed that the 65 Ldn contour line was contained entirely within the Edwards AFB boundary. Because all areas addressed by the AICUZ Program (CZs, APZs, and noise footprint) are contained entirely within the Edwards AFB boundary, Headquarters Air Force Materiel Command continued a previous waiver to Edwards AFB from the requirement for a public AICUZ study. For internal planning purposes, Edwards AFB continues to use all AICUZ criteria in land use decision, airfield design, and safety planning for aircraft operations.

The AFCEE returned to Edwards AFB in September 2003 to update the noise map based on current aircraft types and flight patterns. Results from this study are pending. An initial review of results indicates the updated noise footprint would likely be even smaller and support a continued waiver to a public AICUZ study. Until the 2003 noise analysis is finalized, the 1993 analysis is current and used to evaluate the proposed action.

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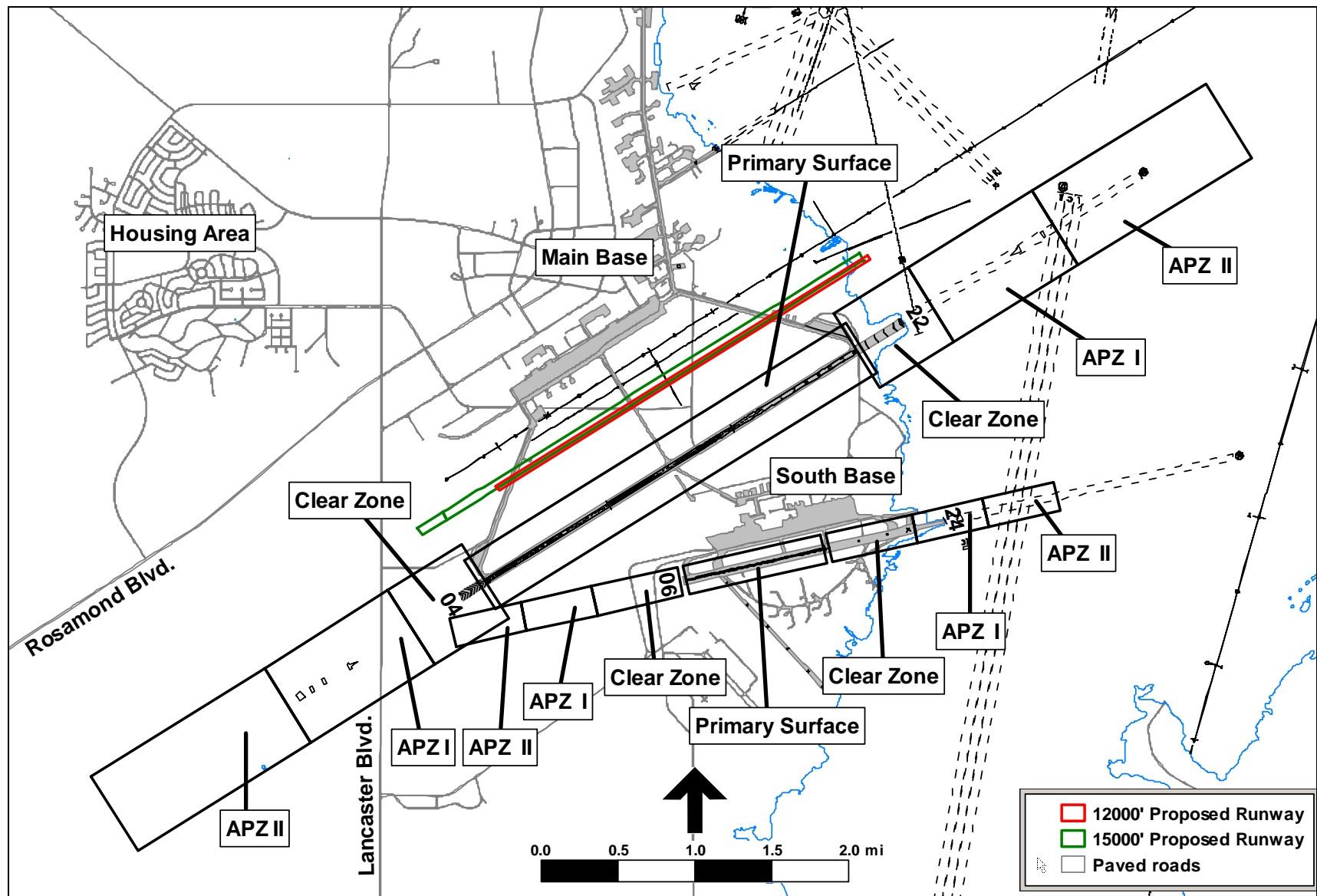


Figure 7 Restricted Areas Associated with Runways

3.1.3 Noise (Annoyance)

Sound can vary simultaneously in level (or loudness) and frequency contact (pitch), while also varying in time of occurrence and duration. The fundamental measure of sound levels is expressed in units of decibels (dB) using a logarithmic scale. Common sounds vary in amplitude over a range of many millions. For instance, an aircraft flyover may produce pressure amplitude a hundred times greater than a car driving by on a nearby street. On the logarithmic scale, these noise sources would differ by 40 dB.

Noise is generally defined as sound that is undesirable because it:

- a. Is intense enough to damage hearing,
- b. Interferes with speech communication and sleep, or
- c. Is annoying.

The Federal Interagency Committee on Urban Noise has developed land use compatibility guidelines for noise and provides recommended day-night average sound level (DNL) ranges for various land use categories based on this committee's findings. The DNL values of 65 dB and less are generally compatible with all types of land uses. Residential, public, and some types of recreational land uses (e.g., outdoor music amphitheaters, nature reserves) are not generally considered compatible with yearly DNL ranges in excess of 65 dB. Commercial, industrial, and other types of recreational land uses (e.g., sports arenas, golf courses, amusement parks) are generally considered compatible with yearly DNL ranges between 70 and 75 dB, if measures are incorporated into the design and construction of structures associated with these land uses. Some transportation (e.g., railways, airports) and manufacturing land uses (e.g., mining, nonlivestock agriculture, fishing, and forestry) can tolerate yearly DNL ranges in excess of 85 dB. Figure 8 compares the relative noise of common sounds.

The primary noise sources on Edwards AFB are subsonic and supersonic aircraft operations. Secondary sources include surface traffic, rail service operations, engine runups and other tests, and equipment required for ground facility operations. Existing noise contours at Edwards AFB are based on flightline operations and can be seen in Figure 9. Ambient noise levels in the developed portions of the Base are presented in Table 6.

Noise sensitive receptors at Edwards AFB include military family housing, dormitories, community health clinic, schools, child development center, and chapels. The location of proposed action is within the Main Base Flightline area and not within the vicinity of the above noise sensitive receptors to impact them.

3.1.4 Airfield Operations

Flightline operations are carried out by the 412th Test Wing (412 TW) and the 95th Air Base Wing (95 ABW). The 412 TW is the direct mission organization of the AFFTC and is responsible for test and evaluation (T&E) of manned and unmanned aerospace vehicles, subsystems, and components. The 95 ABW is the support unit on Edwards AFB that is responsible for communications, civil engineering, EM, transportation (including loading and unloading or armament and supplies), fuel supply, security police, and fire protection.

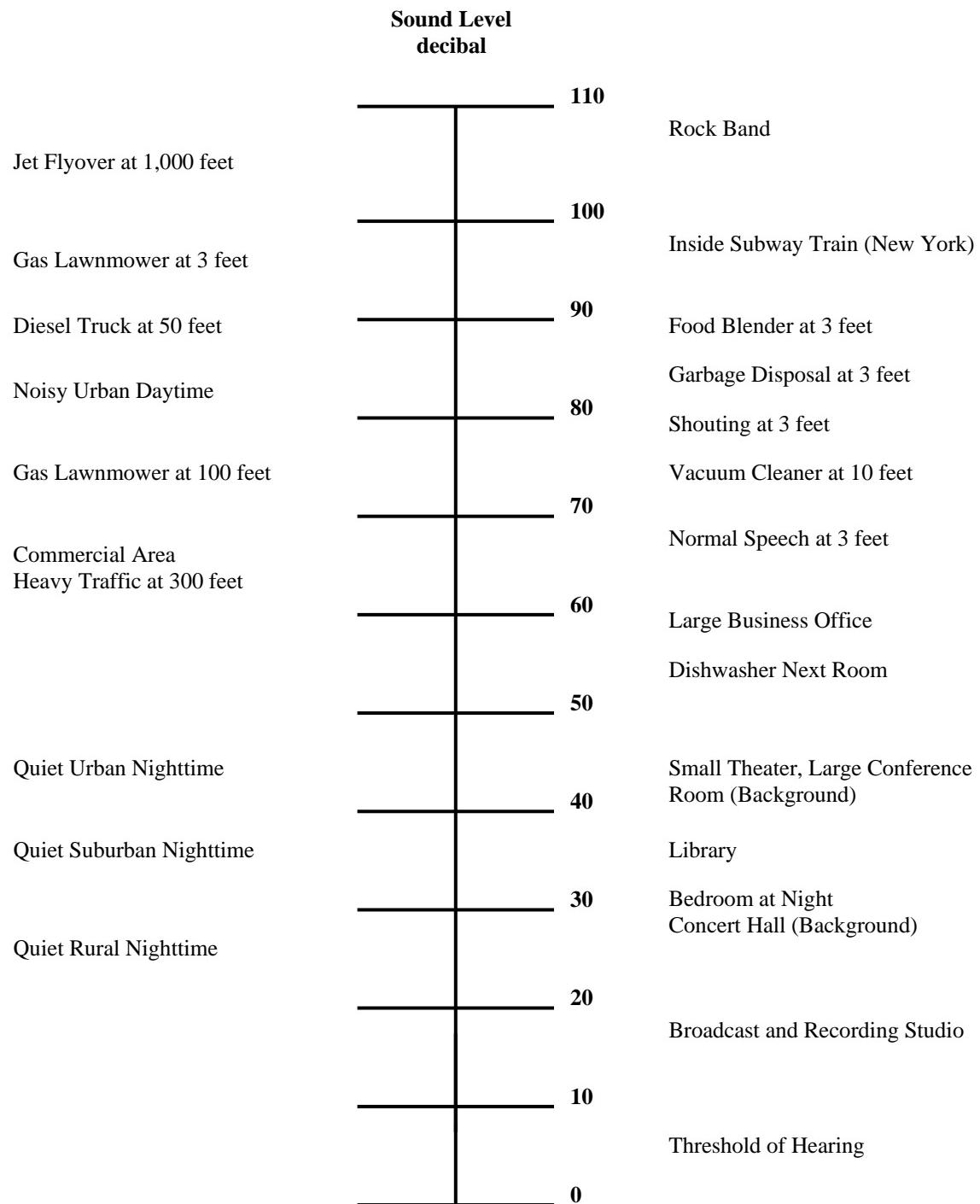
Common Outdoor Sound Levels**Common Indoor Sound Levels**

Figure 8 Comparative A-Weighted Sound Levels

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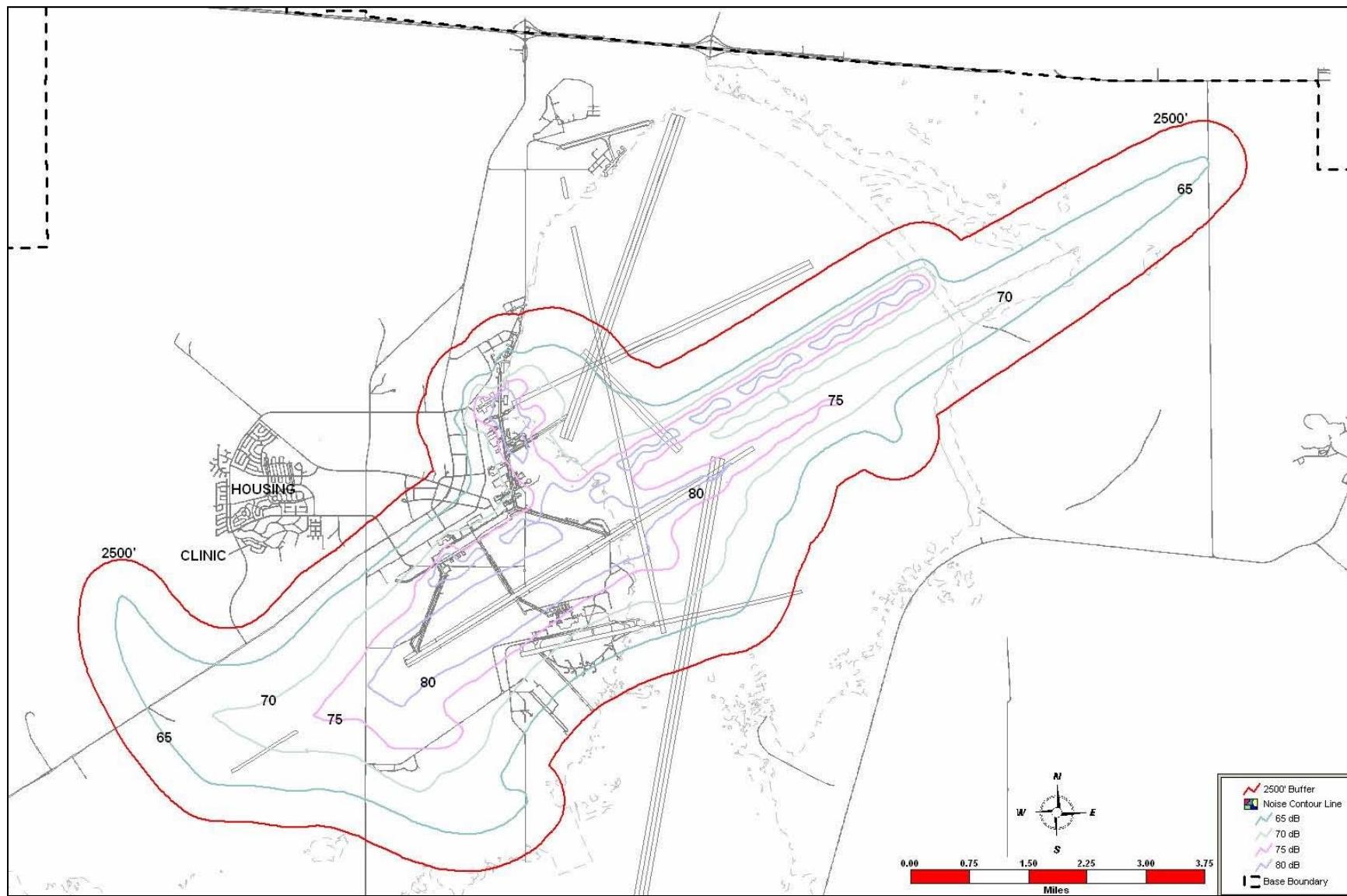


Figure 9 Noise Contour Map

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TABLE 6
AMBIENT (BACKGROUND) NOISE LEVELS RECORDED AT VARIOUS BASE LOCATIONS

Location	L_{dn}
Edwards AFB Housing Area and Vicinity <ul style="list-style-type: none"> * Back of Community Health Clinic * Unpaved Parking Area Near Schools * Northeast of the Hospital Dormitory * Intersection of Forbes Avenue and Yeager Boulevard * Chapel * Golf Course 	67.7 36.9 61.7 61.5 53.6 54.3
Main Base <ul style="list-style-type: none"> * Building 1200 (Base Operations/Base Exchange Cafeteria) * Building 1632 (Aircraft Research Engineering Maintenance Facility) 	68.8 75.6
North Base <ul style="list-style-type: none"> * Near JPL Building 4231 (Satellite Communications Ground Terminal) * Near Taxiway/Runway Intersection * At Building 4444 (Research Equipment Storage) 	60.6 57.2 65.0
South Base <ul style="list-style-type: none"> * B-2 Area * Main Runway (Southeast of) * Inactive Runway 	67.9 72.4 60.8
Air Force Research Laboratory <ul style="list-style-type: none"> * Near Building 8255 (Equipment Research Engineering) * Near Building 8483 (Missile in Space Research Support) 	54.7 46.1
NASA/Dryden Flight Research Center <ul style="list-style-type: none"> * Near Building 4850 (NASA Child Development Center) 	65.5

Notes: 1. L_{dn} – the day/night equivalent noise level. It incorporates a 10-decibel penalty for nighttime noise between 10 pm and 7 am to reflect the added likelihood of annoyance during this period.

2. AFB – Air Force Base
3. JPL – Jet Propulsion Laboratory
4. NASA – National Aeronautics and Space Administration
5. USACE - United States Army Corp of Engineers
6. AFFTC - Air Force Flight Test Center

Source: *Programmatic Environmental Assessment for the Comprehensive Plan of Edwards Air Force Base, California* (USACE and AFFTC 1994)

The 412th Operations Group (412 OG) plans and conducts all flight test activities for the 412 TW. The 412 OG also advises the 412 TW on air traffic control matters and airfield and airspace management, including flight management (AFFTC 1996a). Ridley Mission Control Center is the central safety coordination point for all operations affecting the PIRA.

Airfield operations at the AFFTC are the responsibility of Airfield Management (412 OSS/OSAM). Airfield Management operates the aircraft scheduling system and the Base weather station that provides meteorological support to the AFFTC for all flight test operations at Edwards AFB.

Use of the Edwards AFB airfield is limited to authorized personnel only, such as the AF, other government organizations, and contractors, in order to develop, test, and fly aircraft. Authorized government and private vehicles operate on the roads, taxiways, and runways.

Pedestrian traffic occurs on the airfield, with the heaviest concentration being in and around the hangars. The periods of greatest use on the airfield occur during weekdays.

3.1.4.1 Foreign Object Damage Control

The term FOD refers to damage, particularly to aircraft, that occurs as a result of collision with or ingestion of objects on or around runways, taxiways, and other areas of aircraft operations. The prevention of FOD is targeted specifically at flightline areas, and implementation procedures are contained in the AFFTC Supplement 1 to AFI 21-101, *Aerospace Equipment Maintenance Management*. The Quality Assurance Inspection Branch (412 TW/LGQ) manages the reduction and/or elimination of FOD.

Material or debris such as nuts, bolts, screws, wood, trash, or pieces of concrete or asphalt, may end up on runways, taxiways, or apron areas as a result of routine operations, construction, and/or demolition activities. These objects can puncture tires or damage engines; potentially damaging aircraft and causing possible injury or death to personnel.

Runway 04/22 is deteriorating, creating an increased chance of FOD. The PCI numbers for portions of Runway 04/22 have declined rapidly over the past few years. The cause of the rapid degradation of the concrete has been identified as ASR. The ASR is a condition brought about by a reaction between the cement and the aggregate in the concrete. The ASR results in a gel-like substance that absorbs moisture and swells, thus causing increased map cracking, scaling, and spalling along the slab joints and corners.

Map cracking refers to a network of small, fine, hairline cracks that extend only through the upper surface of the concrete. The thickness of the runway varies from approximately 17 to 19 inches. Therefore, this cracking does not substantially affect the structural capacity of the runway, but it does create continuous FOD problems. Scaling is the breakdown of the slab surface to a depth of approximately $\frac{1}{4}$ to $\frac{1}{2}$ inch. Deicing salts, improper construction, freeze-thaw cycles, and poor aggregate are typical cause of scaling. Products formed by the ASR result in expansions that cause of breakdown in the concrete. This generally occurs throughout the slab and not just at the joints.

3.2 Air Quality

Air quality in California is regulated by the United States Environmental Protection Agency, (U.S. EPA), California Air Resources Board (CARB), 2002, and locally by Air Pollution Control Districts (APCDs) or Air Quality Management Districts (AQMD).

Stationary sources at Edwards AFB typically include fixed sources such as internal combustion engine (ICE) generators, external combustion boilers, and spray paint booths. Mobile sources typically include motor vehicles, construction equipment, and aircraft.

3.2.1 Regulatory Requirements/Guidance

The 1970 *Clean Air Act* (CAA) and the 1990 *Clean Air Act Amendments* (CAAA) (Title 42 USC 7401-7671 and 42 USC 7661) are the body of Federal laws that require the U.S. EPA and State to regulate air pollution emissions from stationary and mobile sources to protect public

health and welfare. Air quality regulations were first promulgated with the CAA and revised with the CAAA. They are published in Title 40 CFR, Parts 50 to 97 and Parts 1048 to 1068.

The Federal CAA requires the U.S. EPA to establish and maintain national ambient air quality standards (NAAQS) that are used to manage air quality across the country. Under the *California Clean Air Act* (CCAA), California Health and Safety Code, Division 26, the State of California has adopted ambient air quality standards, known as the California Ambient Air Quality Standards (CAAQS), which are published in the California Code of Regulations (CCR), Title 17, Section 70200. Generally, CAAQS are more stringent than NAAQS. Pollutants for which standards have been established are termed “criteria” pollutants because the standards are based on criteria that show a relationship between pollutant concentrations and effects on health and welfare. From this relationship, the U.S. EPA and the State establish acceptable pollutant concentration levels to serve as ambient air quality standards.

Title 40 CFR Part 61, *National Emission Standards for Hazardous Air Pollutants*, states that in addition to complying with the provisions of this Part, the owner or operator of a stationary source subject to standards in this Part may be required to obtain an operating permit issued to stationary sources by an authorized State air pollution control agency or by the Administrator of the U.S. EPA pursuant to Title V of the CAA as amended 15 November 1990 (42 USC 7661).

Under the CAAA of 1990, Title V requires air agencies to establish Federal operating permit programs and require major sources of air pollutant to obtain Title V operating permits. A Title V permit is an all-encompassing permit that includes all local air district permits and regulatory requirements and documents compliance with other CAA regulations.

The Federal CAA requires states with nonattainment areas to develop regulations and plans, known as State Implementation Plans (SIPs); describing the measures the State will take to achieve attainment with NAAQS. Within the State of California, the authority to regulate sources of air emissions resides with the CARB and is delegated to local APCDs and AQMDs. Local districts prepare SIP elements for the areas under their regulatory jurisdiction and submit these elements to the CARB for review and approval. The CARB then incorporates the individual air district elements into a Statewide SIP. The Plan is then submitted to the U.S. EPA for approval and publication in the Federal Register. The local districts then enact rules and regulations to achieve their SIP requirements.

3.2.2 Environmental Setting

The AQMD and APCD boundaries are based on meteorological and geographic conditions and, where possible, jurisdictional boundaries such as county lines. Edwards AFB lies within the Mojave Desert Air Basin (MDAB). As shown in Figure 10, Edwards AFB is located within the jurisdiction of three local air districts: KCAPCD, Mojave Desert Air Quality Management District (MDAQMD), and Antelope Valley Air Quality Management District (AVAQMD). The MDAQMD has jurisdiction in San Bernardino County to the east of the project site, and the AVAQMD has jurisdiction in Los Angeles County to the south of the project site.

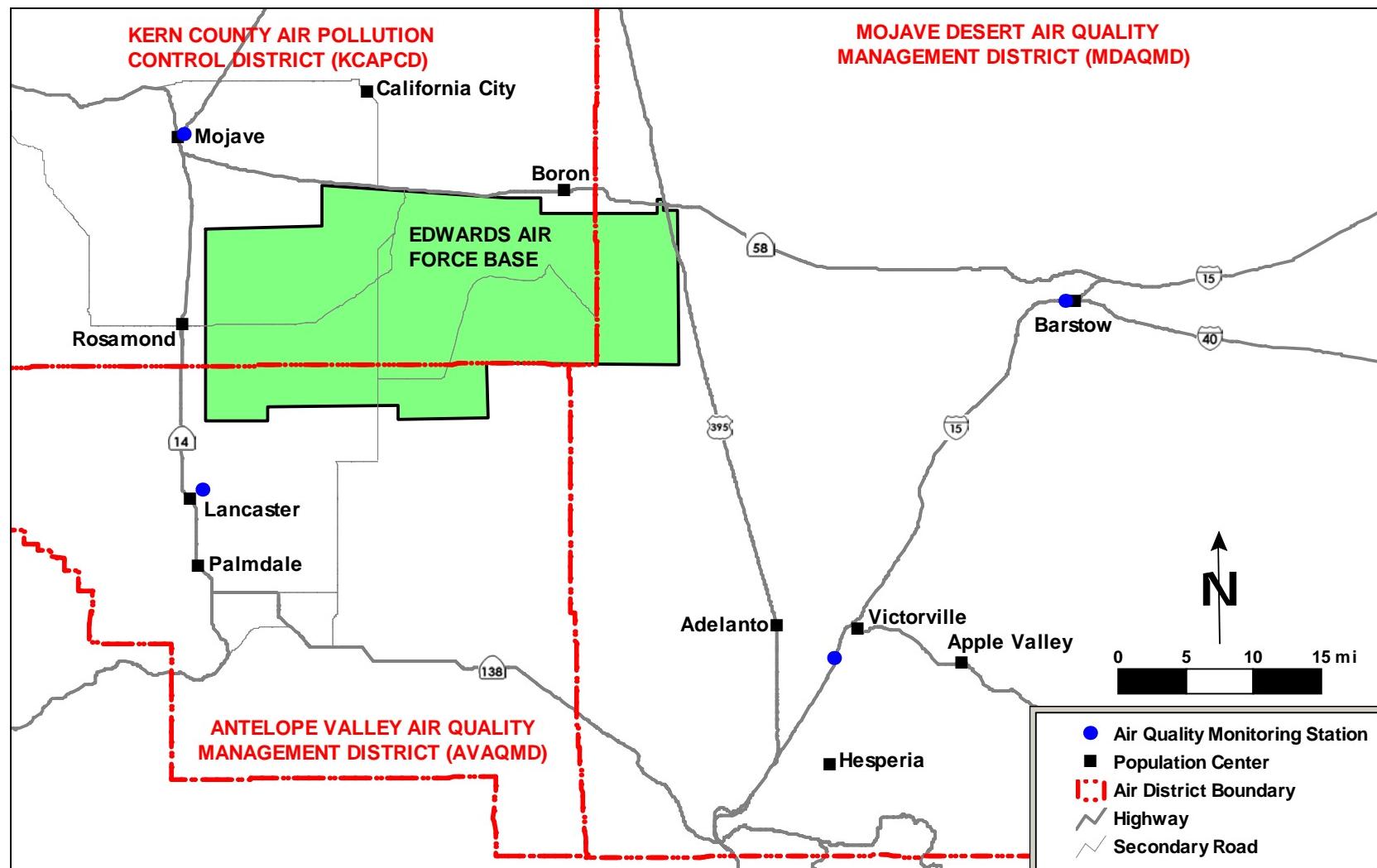


Figure 10 Air District Map

Project activities would occur almost exclusively in the eastern Kern County portion of Edwards AFB, under the jurisdiction of the KCAPCD. As a result, this air quality analysis refers almost exclusively to regulatory requirements and air quality impacts in the KCAPCD area. However, there is some potential for construction delivery and haul vehicles to travel and generate air emissions in the AVAQMD. As these emissions result from mobile sources, the only AVAQMD air quality regulatory requirements that might influence this travel and that associated emissions are those associated with General Conformity (AVAQMD Rule 1901). As a result, only the subsections discussing General Conformity will refer to regulatory requirements and air quality impacts in the AVAQMD.

3.2.2.1 Climate

The Mojave Desert is sheltered from maritime weather influences of the Pacific Ocean by the Coastal range to the west and the San Gabriel Mountains to the south. The MDAB has an arid continental desert climate.

The climate of the Mojave Desert is governed by the strength and location of a semipermanent, subtropical, high-pressure cell over the Pacific Ocean. In general, hot summers, cold winters, infrequent rainfall, active air movement, and very low relative humidity characterize the climate of most of the region.

Thunderstorm activity in the region is rare. Relative humidity at the Base is very low in the summer (30 to 50 percent in the early morning; 10 to 20 percent in the late afternoon). These conditions promote intensive heat during the day in the summer and marked cooling at night. The intense solar radiation in the summer is highly conducive to the formation of ozone and other photochemical oxidants in the atmosphere, but only when precursor chemicals are present.

3.2.2.2 Wind/Pollutant Dispersion

The prevailing wind direction is from the west-southwest (240 degrees) throughout the year with an average windspeed of 8 miles per hour (mph). The highest average windspeeds occur during the spring and summer, with the lowest windspeeds occurring during the winter. Calm occurs about 19.3 percent of the time on an annual basis. Atmospheric stability, the measure of vertical dispersion of pollutants, is high at Edwards AFB. Stable conditions, which are an indication of weak pollutant dispersion, exist about 57 percent of the time; thus indicating that the potential for collection of pollution in the area is relatively high.

Area mountain and valley patterns cause a wide fluctuation in the levels of rainfall, and temperatures influence basin windflow that in turn affect dispersion along mountain ridges, vertical mixing, and photochemistry of pollutants.

The Tehachapi Pass in the Tehachapi Mountains and the pass through Saugus on Highway 14 serve as conduits allowing air movement from the San Joaquin Valley and the Los Angeles areas into the western portion of the MDAB. This air movement allows pollutant transport from the San Joaquin Valley and the Los Angeles basin to influence the air quality of the MDAB. Air pollution also enters the Antelope Valley from the San Bernardino area through the Cajon Pass (AFFTC 1995a).

3.2.2.3 Baseline Air Quality

Air quality in a given location is described by the concentration of various pollutants in the atmosphere, generally expressed in units of parts per million (ppm) or micrograms per cubic centimeter. Air quality is determined by the type and amount of pollutants emitted into the atmosphere, size and topography of the air basin, and prevailing meteorological conditions. The significance of the pollutant concentration is determined by comparing it to the NAAQS and CAAQS. These standards represent the maximum allowable atmospheric concentrations that may occur while ensuring protection of public health and welfare, with a reasonable margin of safety.

The U.S. EPA has developed numerical concentration-based NAAQS for seven criteria pollutants under the provisions of the CAA. The NAAQS have been established for O₃, particulate matter less than or equal to 10 microns (PM10), fine particulate matter equal to or less than 2.5 microns (PM2.5), carbon monoxide (CO), nitrogen dioxide (NO₂), sulfur dioxide (SO₂), and lead (Pb).

The CARB has developed numerical concentration-based CAAQS for the same seven criteria pollutants plus visibility reducing particles, sulfates, hydrogen sulfide, and vinyl chloride. The criteria pollutants and State and Federal standards are listed in Table 7.

The CARB and U.S. EPA track air quality on an ongoing basis and designate areas or basins as either attainment or nonattainment, on a pollutant-specific basis, IAW either CAAQS or NAAQS. As indicated previously, for some pollutants an area can be designated as a basic, moderate, serious, severe, or extreme nonattainment area depending upon the level of pollutant concentrations. Likewise, if standards for pollutants are met in a particular area, the area is designated at attainment. Where standards may not have been established, or monitoring data does not exist for certain criteria pollutants, these areas are considered unclassified. Unclassified denotes a lack of data or other information sufficient to make a designation. Unclassified areas are treated as attainment areas until proven otherwise.

Air quality in a given location is described by the concentration of various pollutants in the atmosphere. The type and amount of pollutants emitted into the atmosphere, the size and topography of the air basin, and the prevailing weather conditions determine air quality. The significance of the pollutant concentration is determined by comparing it to the Federal and State ambient air quality standards. These standards represent the maximum allowable atmospheric concentrations that may occur while ensuring protection of public health and welfare, with a reasonable margin of safety.

Table 8 presents the attainment status of eastern Kern County for criteria pollutants. The attainment status of the neighboring air basins or air districts is very similar to that of eastern Kern County, with the following exceptions:

- a. The Southeast Desert Air Quality Management Area (portions of AVAQMD in Los Angeles County and portions of MDAQMD in San Bernardino County) is designed as *severe* nonattainment for the 1-hour ozone NAAQS and *moderate* nonattainment for the 8-hour ozone NAAQS.

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TABLE 7
FEDERAL AND CALIFORNIA AMBIENT AIR QUALITY STANDARDS

Pollutant	Averaging Time	California Standards ¹		Federal Standards ²		
		Concentration ³	Method ⁴	Primary ^{3,5}	Secondary ^{3,6}	Method ⁷
Ozone (O₃)	1 Hour	0.09 ppm (180 µg/m ³)	Ultraviolet Photometry	0.12 ppm (235 µg/m ³) ⁸	Same as Primary Standard	Same as Primary Standard
	8 Hour	N/A		0.08 ppm (157 µg/m ³) ⁸		
Respirable Particulate Matter (PM10)	24 Hour	50 µg/m ³	Gravimetric or Beta Attenuation	50 µg/m ³	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	20 µg/m ^{3*}		150 µg/m ³		
Fine Particulate Matter (PM2.5)	24 Hour	No Separate State Standard		65 µg/m ³	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	12 µg/m ^{3*}	Gravimetric or Beta Attenuation	15 µg/m ³		
Carbon Monoxide (CO)	8 Hour	9 ppm (10 mg/m ³)	Nondispersive Infrared Photometry (NDIR)	9 ppm (10 mg/m ³)	None	NDIR
	1 Hour	20 ppm (23 mg/m ³)		35 ppm (40 mg/m ³)		
	8 Hour (Lake Tahoe)	6 ppm (7 mg/m ³)		N/A		
Nitrogen Dioxide (NO₂)	Annual Arithmetic Mean	N/A	Gas Phase Chemiluminescence	0.053 ppm (100 µg/m ³)	Same as Primary Standard	Gas Phase Chemiluminescence
	1 Hour	0.25 ppm (470 µg/m ³)		N/A		
Sulfur Dioxide (SO₂)	Annual Arithmetic Mean	N/A	Ultraviolet Fluorescence	0.03 ppm (80 µg/m ³)	N/A	Spectrophotometry (Pararosaniline Method)
	24 Hour	0.04 ppm (105 µg/m ³)		0.14 ppm (365 µg/m ³)		
	3 Hour	N/A		N/A		
	1 Hour	2.25 ppm (655 µg/m ³)		N/A		
Lead (Pb)⁹	30-Day Average	1.5 µg/m ³	Atomic Absorption	N/A	N/A	N/A
	Calendar Quarter	N/A		1.5 µg/m ³	Same as Primary Standard	High Volume Sampler and Atomic Absorption
Visibility Reducing Particles	8 Hour	Extinction coefficient of 0.23 per kilometer-visibility of 10 miles or more (0.07 per kilometer-visibility, 30 miles or more for Lake Tahoe) due to particles when relative humidity is less than 70 per percent. Method: Beta Attenuation and Transmittance through Filter Tape.		No Federal standards		
Sulfates	24 Hour	25 µg/m ³	Ion Chromatography			

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TABLE 7 (Concluded)
FEDERAL AND CALIFORNIA AMBIENT AIR QUALITY STANDARDS

Pollutant	Averaging Time	California Standards¹		Federal Standards²		
		Concentration³	Method⁴	Primary^{3,5}	Secondary^{3,6}	Method⁷
Hydrogen Sulfide	1 Hour	0.03 ppm (42 µg/m ³)	Ultraviolet Fluorescence	No Federal standards		
Vinyl Chloride⁹	24 Hour	0.01 ppm (26 µg/m ³)	Gas Chromatography			

Notes: 1. µg/m³ – 1 x 10⁻⁶ grams per cubic meter

2. N/A – Not Applicable

3. ppm – parts per million

4. mg/m³ - milligrams/per cubic meter

*On 20 June 2002, the Air Resources Board (ARB) approved staff's recommendation to revise the PM10 annual average standard to 20 µg/m³ and to establish an annual average standard for PM2.5 of 12 µg/m³. These standards will take affect upon final approval by the Office of Administrative Law, which is expected in May 2003. Information regarding these revisions can be found at <http://www.arb.ca.gov/research/aaqs/std-rs/std-rs.htm>.

¹California standards for ozone, carbon monoxide (except Lake Tahoe), sulfur dioxide (1 and 24 hour), nitrogen dioxide, suspended particulate matter – PM10, PM2.5, and visibility reducing particles, are values that are not to be exceeded. All others are not to be equaled or exceeded. California ambient air quality standards are listed in the *Table of Standards* in Title 17 California Code of Regulations Section 7020.

²Federal standards (other than ozone, particulate matter, and those based on annual averages or annual arithmetic mean) are not to be exceeded more than once a year. The ozone standard is attained when the fourth highest 8-hour concentration in a year, averaged over 3 years, is equal to or less than the standard. For PM10, the 24-hour standard is attained when 99 percent of the daily concentrations, averaged over 3 years, are equal to or less than the standard. For PM2.5, the 24-hour standard is attained when 98 percent of the daily concentrations, averaged over 3 years, are equal to or less than the standard. Contact the U.S. EPA for further clarification and current Federal policies.

³Concentration expressed first in units in which it was promulgated. Equivalent units given in parentheses are based upon a reference temperature of 25 degrees Centigrade and a reference pressure of 760 torr. Most measurements of air quality are to be corrected to a reference temperature of 25 degrees Centigrade and a reference pressure of 760 torr; ppm in this table refers to ppm by volume, or micromoles of pollutant per mole of gas.

⁴Any equivalent procedure that can be shown to the satisfaction of the Air Resources Board (ARB) to give equivalent results at or near the level of the air quality standard may be used.

⁵National Primary Standards: The levels of air quality necessary, with an adequate margin of safety to protect the public health.

⁶National Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.

⁷Reference method is as described by the U.S. EPA. An “equivalent method” of measurement may be used but must have a “consistent relationship to the reference method” and must be approved by the U.S. EPA.

⁸U.S. EPA promulgated new Federal 8-hour ozone and fine particulate matter standards on 18 July 1997. Contact the U.S. EPA for further clarification and current Federal policies.

⁹The ARB has identified lead and vinyl chloride as “toxic air contaminants” with no threshold of exposure for adverse health effects determined. These actions allow for the implementation of control measures at levels below the ambient concentrations specified for these pollutants.

¹⁰Source: California Air Resources Board, 09 Jul 03

TABLE 8
ATTAINMENT STATUS OF EASTERN KERN COUNTY

Pollutant	Federal Status	State Status
Ozone (O_3) – 1-hour	Attainment/Maintenance	<i>Moderate</i> Nonattainment
Ozone (O_3) – 8-hour	<i>Basic</i> Nonattainment	Not Applicable
Respirable Particulate Matter (PM10)	Unclassified	Nonattainment
Fine Particulate Matter (PM2.5)	Unclassified ²	Unclassified ²
Carbon Monoxide (CO)	Unclassified/Attainment	Unclassified
Nitrogen Dioxide (NO_2)	Unclassified/Attainment ³	Attainment ⁴
Sulfur Dioxide (SO_2)	Unclassified/Attainment ³	Unclassified ⁴
Lead ⁴	Attainment	Attainment ⁴
Visibility Reducing Particles	No Federal Standard	Unclassified ⁴
Sulfates	No Federal Standard	Attainment
Hydrogen Sulfide	No Federal Standard	Unclassified
Vinyl Chloride ⁵	No Federal Standard	Unclassified

Source: California Air Resources Board, 9 Jun 03

PM2.5 is currently not classified; U.S. EPA is due to make final designation for PM2.5 by December 2004.

All areas in the State are either attainment or unclassified for nitrogen dioxide and sulfur dioxide.

All areas in the State are either attainment or unclassified for nitrogen dioxide, sulfur dioxide, lead, and visibility reducing particles.

The California Air Resources Board (CARB) has identified lead and vinyl chloride as “toxic air contaminants” with no threshold of exposure for adverse health effects determined. These actions allow for the implementation of control measures at levels below the ambient concentrations specified for these pollutants.

- b. The MDAQMD is also designated *moderate* nonattainment for the NAAQS for PM10.
- c. The MDAQMD is also designated *moderate* nonattainment for the State ozone standard, but the portion of the AVAQMD in Los Angeles County is designated *extreme* nonattainment for the ozone CAAQS based on historical South Coast Air Basin designation (AVAQMD 2002).

3.2.2.3.1 Ozone

Ozone is what is referred to as a secondary pollutant, a pollutant formed in the atmosphere by photochemical reactions involving previously emitted pollutants or precursors. Ozone precursors are mainly two types, VOCs and NO_x . Volatile organic compounds are organic compounds that contain carbon and hydrogen. The U.S. EPA defines a VOC as any organic compound that participates in atmospheric photochemical reactions. Nitrogen oxide is the designation given to the group of all oxygenated nitrogen species, including nitric oxide, nitrogen dioxide, nitric anhydride, and nitrous anhydride. Since VOCs and NO_x participate in atmospheric photochemical reactions that produce ozone, the attempt is made to control ozone through the control of VOCs and NO_x . Therefore, the pollutants of concern are VOCs and NO_x .

Identifying the region of influence for air quality assessment requires knowledge of the pollutant types, source emission rates and release parameters, and local and regional

meteorological conditions. For inert pollutants (all pollutants other than ozone, its precursors, and NO₂), the region of influence is generally limited to an area within a few miles downwind from the source. The region of influence for ozone may extend much farther downwind than that for other pollutants. In the presence of solar radiation, the maximum effect of precursor emissions on ozone levels usually occurs several hours after they are emitted and many miles from the source.

Ozone and its precursors transported from other regions can also combine with local emissions to produce high local ozone concentrations. Ozone concentrations are generally the highest during the summer months and coincide with periods of maximum solar radiation. The maximum effect of precursor emissions on ozone levels usually occurs several hours after they are emitted and many miles from the source. Maximum ozone concentrations tend to be regionally distributed because precursor emissions are homogeneously dispersed in the atmosphere (AFFTC 1995a). Ozone may pose a health threat to those who already suffer from respiratory diseases as well as healthy people.

Until very recently, air quality in eastern Kern County was designated *serious* nonattainment for the Federal 1-hour ozone standard. On 22 April 2004, the U.S. EPA issued a direct final rule to designate eastern Kern County areas as attainment for the 1-hour ozone NAAQS and also approved their maintenance plan. On 15 April 2004, the U.S. EPA designated eastern Kern County as *basic* nonattainment for the 8-hour ozone NAAQS.

Under State regulations, the eastern Kern County area is designated *moderate* nonattainment for ozone. The area is attainment for PM10 under Federal regulations, but is nonattainment under State standards.

3.2.2.3.2 Particulate Matter

Particulate matter consists of very small liquid and solid particles in the air. Particulate matter less than 10 microns in diameter are referred to as PM10. Sources of PM10 include motor vehicles; wood-burning stoves and fireplaces; dust from construction, landfills, and agriculture; wildfires and bush/waste burning; industrial sources; and windblown dust from open lands. Particulate matter also forms when gases are emitted from motor vehicles and also causes reduced visibility. Health effects include increased respiratory disease, lung damage, and cancer, thus resulting in premature death.

The measurement of existing ambient criteria pollutant concentrations is accomplished using air quality monitoring stations. The closest CARB air quality monitoring station to Edwards AFB is located in Mojave, California. Table 9 shows the 2000 through 2002 data received at the monitoring station for criteria pollutants as they relate to NAAQS and CAAQS and the number of times the criteria pollutants measured at the Mojave Air Station equaled or exceeded the standards for a given year. For the purpose of this EA, these data are provided as information only. This data is only provided to illustrate the current ambient air quality in the Edwards AFB area.

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TABLE 9
NUMBER OF DAYS MOJAVE AIR STATION WAS ABOVE THE HOURLY STANDARD FOR
CRITERIA POLLUTANTS

CRITERIA POLLUTANT	DAYS EQUAL TO/OR EXCEEDING AIR QUALITY STANDARDS	
	NAAQS	CAAQS
Ozone (O_3)	0 (2000)	25 (2000)
	1 (2001)	33 (2001)
	0 (2002)	18 (2002)
Respirable Particulate Matter (PM10)	0 (2000)	0 (2000)
	0 (2001)	0 (2001)
	1 (2002)	0 (2002)
Fine Particulate Matter (PM2.5)	0 (2000)	0 (2000)
	0 (2001)	0 (2001)
	0 (2002)	0 (2002)
Nitrogen Dioxides		0 (2000) 0 (2001) 0 (2002)

Notes: 1. NAAQS - National Ambient Air Quality Standard

2. CAAQS - California Ambient Air Quality Standard

Source: California Air Resources Board, 15 May 03

3.2.3 Local District Control

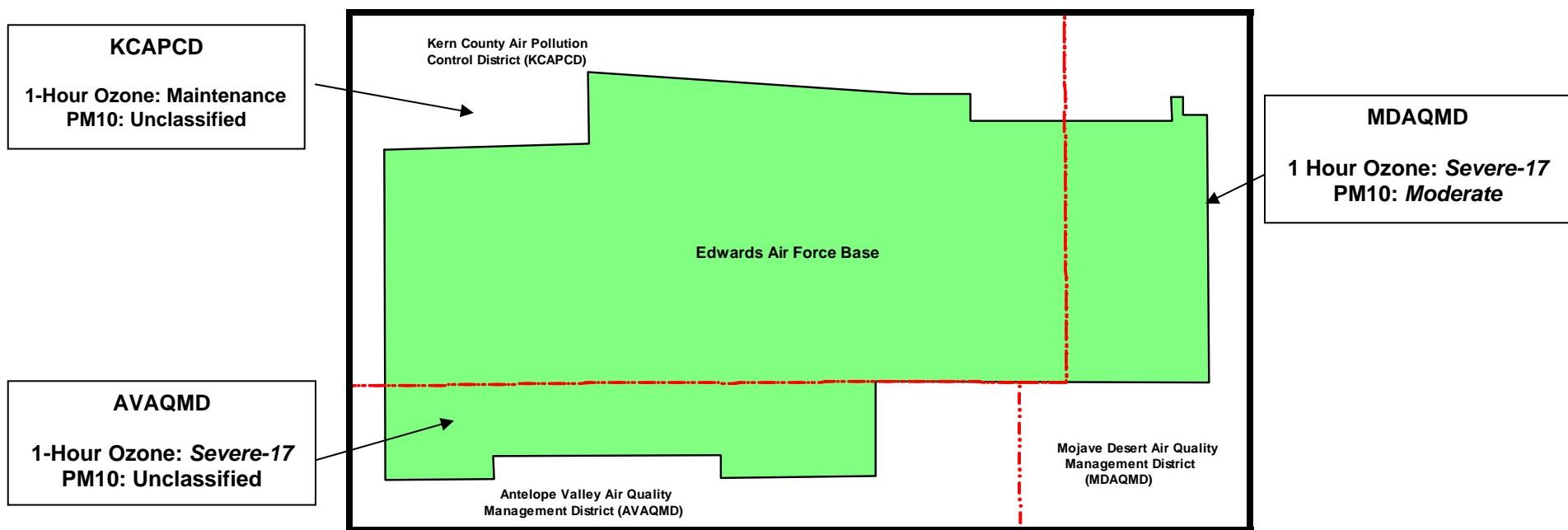
The NAAQS nonattainment status of the air districts with jurisdiction over Edwards AFB is presented in Figure 11. As indicated previously, the KCAPCD is designated as being attainment/maintenance for the 1-hour ozone NAAQS, *basic* nonattainment for the 8-hour ozone NAAQS, and in attainment or unclassified for all other pollutants.¹

To ensure compliance with relevant Federal and State air laws, each district enacts their own rules and regulations. Local air districts use stationary source new source review (NSR) permits, such as an ATC and a PTO as one means of implementing air quality rules and regulations. In addition, districts like the KCAPCD may develop guidelines for environmental review of proposed projects under the *California Environmental Quality Act* (CEQA).

For KCAPCD, NSR is implemented under KCAPCD Rule 210.1, *New and Modified Stationary Source Review (NSR)*. These rules and regulations provide for the preconstruction review of new and modified stationary sources of affected air pollutants to ensure emissions would not interfere with the attainment of ambient air quality standards; ensure appropriate new and modified sources of affected pollutants are constructed with the Best Available Control Technology (BACT); and provide for no net increase in emissions from new and modified stationary sources for all nonattainment pollutants and their precursors.

¹ The KCAPCD has jurisdiction over the eastern half of Kern County, which was recently redesignated as attainment/maintenance for the 1-hour ozone NAAQS. The Southeast Desert Air Quality Management Area (portions of AVAQMD in Los Angeles County and portions of MDAQMD in San Bernardino County) is designated as *severe* nonattainment for the 1-hour ozone NAAQS and *moderate* nonattainment for the 8-hour ozone NAAQS. The AVAQMD has jurisdiction over northern Los Angeles County and is classified with regard to attainment status separately from the rest of Los Angeles County. The MDAQMD is also designated *moderate* nonattainment for the NAAQS for PM10.

EDWARDS AFB Current NAAQS Attainment Status



LEGEND

Severe-17 = 25-ton limit per pollutant per action per year

Maintenance = 100-ton limit per pollutant per action per year

Moderate = 100 ton-limit per pollutant per action per year

Unclassified = no established limit

SOURCE: 40 Code of Federal Regulations 81.305

Figure 11 Attainment Status Map

In order to enforce these rules, the air districts have established baseline emission levels for new or modified stationary sources of PM10, sulfur oxides (SO_x), NO_x, and VOCs in nonattainment areas (Table 10). Projects that generate emissions in excess of these threshold levels would require offsets.

**TABLE 10
NEW SOURCE REVIEW THRESHOLD EMISSION LEVELS**

New Source Review Threshold Emission Levels per Pollutant (tons/year)				
Air District	PM10	SO_x	VOC	NO_x
KCAPCD	15	27	25	25

- Notes:
1. PM10 – particulate matter less than or equal to 10 microns
 2. SO_x – sulfur oxides
 3. VOC – volatile organic compounds
 4. NOX – oxides of nitrogen
 5. KCAPCD – Kern County Air Pollution Control District

Source: KCAPCD Rules and Regulations 2004 – <http://www.arb.ca.gov/DRDB/KER/CURHTML/R210-1.HTM>.

In this case, the proposed project is not a stationary source subject to KCAPCD NSR permitting requirements. Rather, it is primarily a construction project using on- and off-road equipment and vehicles. The proposed project would not require KCAPCD air permits, with the exception of a permit for any stationary sources required by the construction contractor (e.g., asphalt and concrete batch plants or stationary [ICEs]).

The proposed project is not subject to the *California Environmental Quality Act* (CEQA), as stated in the KCAPCD CEQA guidelines, “Federal government actions that do not require a District permit are not subject to CEQA” (KCAPCD 1999).

3.2.3.1 Toxic Air Contaminants and Hazardous Air Pollutants

In addition to the criteria pollutants, concern about noncriteria pollutants or toxic air contaminants (TACs) and HAPs has increased in recent years. The TACs include airborne inorganic and organic compounds that can have both short-term (acute) and long-term (carcinogenic, chronic, and mutagenic) effects on human health. At the Federal level, potentially toxic pollutants are called HAPs. The HAPs are defined as air pollutants that may cause serious human health effects, including mortality.

At Edwards AFB, TACs or HAPs are generated as a result of various processes, including aircraft cleaning and painting, lubricating processes, fuel combustion (e.g., tactical support equipment [TSE}, boilers, turbine engines), and adhesive/sealant applications.

The U.S. EPA and California agencies have written regulations to evaluate, and if necessary, mitigate TAC emission sources. Prior to the 1990 CAAA, the U.S. EPA conducted a program to establish National Emission Standards for Hazardous Air Pollutants (NESHAPs). The NESHAPs were established for benzene, vinyl chloride, radionuclides, mercury, asbestos, beryllium, inorganic arsenic, radon 222, and coke oven emissions. The 1990 CAAA lists 189 total pollutants that are defined as HAPs and requires the U.S. EPA to set standards for categories and

subcategories of sources that emit HAPs rather than for the pollutants themselves. The U.S. EPA began issuing the new standards in November 1994. The NESHAPs set prior to 1991 remain applicable.

The applicability of a NESHAP to a facility operation is determined by the potential to emit (PTE) HAPs from all applicable sources. The HAP PTE threshold values are 10 tons per year for a single HAP and 25 tons per year for any two or more HAPs.

Based on its PTE, Edwards AFB is defined as a major source of HAPs and must comply with any applicable NESHAP. One NESHAP that applies to Edwards AFB is the Aerospace NESHAP (40 CFR Part 63, Subpart GG). This NESHAP controls HAP emissions resulting from aerospace manufacturing and rework facilities.²

In California, Assembly Bill (AB) 1807, the *Tanner Act*, established the State Air Toxics Program for identifying and developing emissions control and reduction methods for TACs. The Bill formally designated 18 substances as TACs. In 1993, the 189 HAPs identified by the U.S. EPA were incorporated into California law as TACs. Other pollutants have been added more recently, such as particulate emissions from diesel-fueled engines, designated by California as a carcinogen.

The California Air Toxic Hot Spots Program was created by the *Air Toxics “Hot Spots” Information and Assessment Act of 1987* (AB 2588 and California State Health and Safety Code Sections 44300 through 44384). The Act regulates more than 700 air toxics, including all designated TACs. Under AB 2588, industrial and municipal facilities emitting more than 10 tons per year of any criteria air pollutant must estimate and report their TAC emissions to local air districts. The local air districts then prioritize facilities as high, medium, or low priority. This designation is used to determine the specific requirements needed to comply with AB 2588. High-priority facilities are required to submit a human health risk assessment. If the predicted health risks are great enough, the facility must communicate the results to the public and implement a risk reduction program. Medium- and low-priority facilities are merely required to pay fees and provide updates to their emission inventories every 4 years or sooner if major changes affecting TACs are undertaken.

In 1994, based on the basewide TAC emission inventory, the KCAPCD rated Edwards AFB as a medium-priority facility. No further action has been required other than a periodic inventory update.

3.2.3.2 California State Implementation Plan

The California O₃ SIP was approved by the U.S. EPA in September 1996 and codified into law in 40 CFR 52, Subpart F.³ Other than this SIP and the documents described in the following; no other SIPs or air quality management plans apply to the proposed project site.

² Typical processes and operations at Edwards AFB include hand-wipe cleaning, spray gun cleaning, primer and topcoat application, paint stripping, waste storage and handling, and chemical milling maskant.

³ This SIP also includes the AVAQMD 1994 Air Quality Management Plan (AVAQMD 1994).

The proposed project at Edwards AFB would be located in eastern Kern County, under the jurisdiction of the KCAPCD. Until recently, the U.S. EPA had designated the KCACPD as being *serious* nonattainment for the 1-hour ozone NAAQS. The applicable ozone SIP for eastern Kern County consisted of the *Attainment Demonstration and the Reasonable Further Progress Plan (Post-1996 Rate of Progress Plan) Volumes I and II* (KCAPCD 1994). These documents were based on a 1999 attainment date.

Based on ambient monitoring data from 1999 to 2003, the KCAPCD staff have determined that the area has attained the 1-hour ozone standard and prepared an *Ozone Attainment Demonstration, Maintenance Plan, and Redesignation Request (Maintenance Plan)* (KCAPCD 1993). Approval of this request by the U.S. EPA would result in a revised O₃ SIP.

On 22 April 2004, the U.S. EPA published a Direct Final Rule in the Federal Register regarding Approval and Promulgation of Implementation Plans, Finding of Attainment, and Designation of Areas for Air Quality Planning Purposes; 1-Hour Ozone Standard, East Kern County, California (Federal Register, Volume 69, Number 78, Pages 21731-21737). In this rule, the U.S. EPA announced redesignation of the eastern Kern County area as attainment for the 1-hour ozone NAAQS, approving the eastern Kern County 1-hour ozone maintenance plan and motor vehicles emissions budgets as revisions to the eastern Kern County portion of the California O₃ SIP. This final rule became effective on 21 June 2004 (Jesson 2004).

On 15 April 2004, the U.S. EPA designated eastern Kern County as *basic* nonattainment for the 8-hour ozone NAAQS (40 CFR 81). The KCAPCD will be required to prepare a *basic* attainment plan for EPA approval by June 2007.

3.2.4 Conformity Requirements

Under the conformity provisions of the Federal CAAA, no Federal agency can approve or undertake a Federal action, or project, unless the project has been demonstrated to conform to the applicable SIP. These conformity provisions were put in place to ensure that Federal agencies contribute to efforts to attain the NAAQS. The U.S. EPA has issued two conformity guidelines: transportation conformity rules that apply to transportation plans and projects and general conformity rules that apply to all other Federal actions. A conformity determination⁴ is only required for the alternative that is ultimately selected and approved. The general conformity determination is submitted in the form of a written finding, issued after a minimum 30-day public comment period on the draft determination.

Applicable only in areas designated as nonattainment or maintenance for NAAQS, the general conformity rule prohibits any Federal action that does not conform to the applicable air quality attainment plan or SIP. General conformity applicability analysis required quantification of construction and operation emissions for the project and comparison of these emission levels to baseline emission levels. If the differences in emissions (i.e., the net emission associated with the

⁴ A conformity determination is a process that demonstrates how an action would conform to the applicable implementation plan. If the emissions cannot be reduced sufficiently, and if air dispersion modeling cannot demonstrate conformity, then either a plan for mitigating or a plan for offsetting the emissions would need to be pursued.

proposed project) exceed the general conformity *de minimis* levels for the peak year or any milestone year for attainment of standards, additional general conformity determination is required.

A project is exempt from the conformity rule (presumed to conform) if the total net project-related emissions (construction and operation) pass two tests: they are less than the *de minimis* thresholds established by the conformity rule and they are not regionally significant (emissions are regionally significant if they exceed 10 percent of the total threshold emission inventory). A project that produces emissions that exceed conformity thresholds, or is regionally significant, is required to demonstrate conformity with the SIP through minimization or other accepted practices.

The proposed project is located within the Kern County portion of Edwards AFB. The area attains or is unclassified for all NAAQS, except for the 1- and 8-hour ozone NAAQS, for which the area is, classified attainment/maintenance and *basic* nonattainment, respectively. In this area, the ozone precursor emissions, NO_x and VOC, are subject to general conformity requirements. In accordance with the air conformity requirements of 40 CFR 51.853/93.153(b)(1) and KCAPCD Rule 210.7, the *de minimis* levels set for the O₃ attainment/maintenance areas is up to 100 tons per O₃ precursor pollutant (NO_x and VOC) per year per Federal action. The same *de minimis* level has been assumed for the basic nonattainment area.⁵

As indicated previously, project activities would occur almost exclusively in eastern Kern County, in the KCAPCD portion of the Base. As a result, this air quality analysis refers almost exclusively to regulatory requirements and air quality impacts in KCAPCD. However, there is some potential for project-related construction delivery and haul vehicles would travel and generate air emissions in northern Los Angeles County, in the AVAQMD portion of the Base. Because this emissions increase would occur in an area that is nonattainment for the ozone NAAQS, and because the emissions increase associated with this motor vehicle travel would indirectly result from the proposed project, this potential emission increase has also been considered in the analysis of the applicability of general conformity to the proposed project. The applicable *de minimis* level for O₃ *severe* nonattainment areas, such as AVAQMD, is up to 25 tons per O₃ precursor pollutant (NO_x and VOC) per year per Federal action.

In addition to *de minimis* levels, the NAAQS regional planning emission inventories for KCAPCD and AVAQMD would be used to determine the applicability of air conformity requirements to the proposed action. For KCAPCD and AVAQMD, the regional planning emission inventories for O₃ precursor pollutants (NO_x and VOC) are included in the 1994 California O₃ SIP (CARB 1994). In the California O₃ SIP, the regional planning baseline year is 1990. Table 11 present the 1990 regional baseline emission inventory and the 10-percent threshold values.

3.3 Water Resources

Water resources describe the quality, quantity, source, and use of water at Edwards AFB. This includes drinking (potable) water, wastewater, and stormwater. The sources of water on

⁵ The U.S. EPA has not yet ruled on *de minimis* levels for basic nonattainment areas, but it can be assumed that the same levels would be allowed for basic nonattainment areas as are currently allowed for *moderate* nonattainment areas. *Basic* nonattainment areas have less severe air quality issues than *moderate* nonattainment areas and earlier attainment target dates.

TABLE 11
1990 BASELINE AND 10-PERCENT THRESHOLD VALUES

District	1990 Baseline Values (tons/year)			10-Percent Threshold (tons/year)		
	NO_x	VOC	PM10	NO_x	VOC	PM10
KCAPCD	14,965	6,205	N/A	1,496.5	620.5	N/A
AVAQMD	10,220	12,775	N/A	1,022.0	1,277.5	N/A

Notes: 1. NO_x – oxides of nitrogen
 2. VOC – volatile organic compound
 3. PM10 – particulate matter less than or equal to 10 microns
 4. KCAPCD – Kern County Air Pollution Control District
 5. N/A – Not Applicable
 6. AVAQMD – Antelope Valley Air Quality Management District

Source: CARB 1994, California SIP for O₃. Submitted to U.S. EPA on 15 November 1994. Accessed at <http://www.arb.ca.gov/planning/sip/94sip/94sip.htm> on 21 June 2004.

Edwards AFB include groundwater, Antelope Valley-East Kern (AVEK) Water Agency water, treated wastewater (irrigation), and stormwater.

Edwards AFB has various facilities dedicated to water resources. They include six chlorination points for drinking (potable) water, numerous potable and nonpotable water storage tanks, two operating wastewater treatment plants (Main Base and the AFRL with associated evaporation ponds), and stormwater retention ponds.

3.3.1 Regulatory Requirements/Guidance

The *Clean Water Act* (CWA) (33 USC 1251 et seq.), as amended, is designed to restore and maintain the chemical, physical, and biological integrity of surface waters. The CWA establishes effluent standards on an industry basis and addresses water pollution issues through a permitting system designed to control, and eventually eliminate, water pollution. Violations of the CWA can result in large fines and/or imprisonment.

Air Force Instruction 32-7041, *Water Quality Compliance*, provides details of the AF Water Quality Compliance Program. It applies to generating, collecting, treating, reusing, and disposing of domestic and industrial wastewater, stormwater, nonpoint-source runoff, sewage sludge, and water treatment residuals. It also explains how to assess, attain, and sustain compliance with the CWA; other Federal, State, and local environmental regulations; and related DOD and AF Directives.

Construction activities on Edwards AFB should adhere to the terms and conditions of the *Storm Water Pollution Prevention Plan (SWPPP)*, *Edwards Air Force Base, California* (AFFTC 1998). The SWPPP identifies and assesses sources of stormwater pollution and develops practices and controls to reduce the amount of pollutants in stormwater discharges.

3.3.2 Stormwater Management

Edwards AFB has been subdivided into six Stormwater Management Units (SMUs): Main Base Flightline, Main Base miscellaneous, South Base, NASA, AFRL, and North Base. These units are defined as nonphysical in that the boundaries reflect tenant lease areas and other organizational areas. In addition to the stormwater management units, eight stormwater drainage

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areas have also been delineated in the Edwards AFB SWPPP. These Stormwater Drainage Areas (SWDAs) include the Main Base Flightline South, Main Base Flightline Central, NASA/Main Base Flightline North, South Base, North Base, Piute Ponds, Small Arms Range, and the Main Base Outlying Region. These SWDAs are delineated with respect to topographical features. The SWPPP describes each drainage area in detail including watershed association, area covered, containment structures and areas, and facility association (AFFTC 1998). Proposed project activities would be located within the Main Base Flightline Management Unit.

The Main Base Flightline SMU covers approximately 5 square miles. Most of the area is developed due to the many runways, taxiways, parking areas, and buildings associated with the various aircraft testing programs on the flightline. Approximately 80 percent of this SMU is impervious.

The NASA/Main Base Flightline North SWDA is part of both the Muroc Junction and the Mojave-Soledad Mountain Drainage Areas, subwatersheds of the Antelope Valley Basin. The NASA/Main Base Flightline North SWDA covers approximately 1,485 acres. Stormwater drainage in this area is recovered by catch basins and retention ponds located adjacent to Rogers Dry Lake. At the NASA complex a pair of retention ponds, located adjacent to Rogers Dry Lake collect most stormwater runoff. The remaining runoff travels over land to a second location just north of Building 1850. Some stormwater runoff from Main Base also reaches this second location. Ultimately, the runoff from these two sources combine as the second location discharges into Rogers Dry Lake at a point approximately 800 feet east of Building 4809. With the exception of a small area around Building 3800, stormwater runoff in the Main Base Flightline North SWDA is diverted to a catch basin just north of the General Electric Company jet engines test cell. Building 3800 drainage is conveyed via a 10-inch storm sewer to a point 60 feet south of Pad 19 where it discharges to a catch basin. Major industrial activities in this drainage area include aircraft maintenance and repair, as well as aircraft testing programs. The operations at these facilities have the potential to contribute pollutants into stormwater discharge.

The Main Base Flightline Central SWDA is part of the Mojave-Soledad Mountain Drainage Area, a subwatershed of the Antelope Valley Basin. The Main Base Flightline Center SWDA covers approximately 745 acres. Stormwater drainage is collected by a system of storm sewers that discharge at a centralized point approximately 1,050 feet northeast of Building 1930. Aircraft and motor vehicle maintenance and repair are the main industrial activities in this area. The operations at these facilities have the potential to contribute pollutants into stormwater discharge.

The Main Base Flightline South SWDA is part of the Mojave-Soledad Mountain Drainage Area, a subwatershed of the Antelope Valley Basin. The Main Base Flightline South SWDA covers approximately 628 acres. An evaporation pond, approximately 3,000 feet northeast of Building 1600 collects stormwater in this SWDA. Aircraft maintenance and repair comprises the largest portion of industrial activities in this area. The operations at these facilities have the potential to contribute pollutants into stormwater discharge.

The Edwards AFB SWPPP identifies and assesses sources of stormwater pollution and develops practices and controls to reduce the amount of pollutants in stormwater discharges. The SWPPP helps identify the sources of pollution that affect the quality of industrial stormwater and

authorized nonstormwater discharges, and ensures the implementation of the best management practices (BMPs) to reduce or prevent pollutants in industrial stormwater discharges and authorized nonstormwater discharges.

3.4 Safety and Occupational Health

Safety and occupational health is defined as the protection of workers and the public from hazards. The total accident spectrum encompasses not only injury to personnel, but also damage or destruction of property or products. For worker safety, the boundary of the immediate work area defines the region of influence.

3.4.1 Regulatory Requirements/Guidance

The Occupational Safety and Health Administration (OSHA) developed standards to promote a safe working environment. These standards establish general environmental controls, including personal protective equipment, wherever necessary because of hazards, processes, or the environment. Exposure limits for noise, ionizing and nonionizing radiation, and toxic and hazardous substances have been established, as well as requirements for handling and storing compressed gases and flammable liquids. The OSHA Act also provides standards for emergency response to related hazardous chemical and hazardous wastes.

Statutory and regulatory requirements of the Federal OSHA and the Air Force Occupational Safety and Health (AFOSH) Standards, which apply to the safety of workers on Edwards AFB, are enforced locally by Bioenvironmental Engineering, Ground Safety, and the Base Fire Department. In addition, operational safety is supervised by various offices for specific activities.

The OSHA General Duty Clause, Section 5(a)1, states that employers will provide a workplace free of recognized hazards that cause or are likely to cause death or serious physical harm.

Title 29 CFR 1910.95, *Occupational Noise Exposure*, states that protection against the effects of noise exposure shall be provided when the sound levels exceed those shown in this Regulation.

Title 29 CFR 1910.1025, *Lead*, applies to all occupational exposures to lead in all industries covered by the OSHA Act.

Title 29 CFR 1926.62, *Lead*, applies to all construction work where an employee may be occupationally exposed to lead. All construction work is excluded from coverage in the general industry standard for lead by 29 CFR 1910.1025(a)(2) and is covered by this Standard. Construction work is defined as work for construction, alteration, and/or repair, including painting and decorating.

3.4.2 Exposure Hazards

Hazardous noise exposure occurs when workers are present in areas where ambient noise levels exceed 85 dB. To prevent potentially harmful effects to AF and civilian personnel from exposure to hazardous noise, the USAF established a hazardous noise program under AFOSH Standard 48-19, *Hazardous Noise Program*. Under this Program, Bioenvironmental Engineering is responsible for accomplishing hazardous noise surveillance to determine if

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military or DOD civilian personnel working in areas where hazardous noise exposure may occur require engineering and administrative controls, personal protection, or if potential hazardous noise areas require signage. Non-DOD civilian personnel working on the installation are exempt from AFOSH Standard 48-19, but must comply with applicable Federal and State regulations.

Hazardous noise areas exist in the Main Base Flightline area. As such, workers are required to implement hearing protection measures. In addition, signs are posted to alert workers present in these areas.

Lead-based paints were commonly used from the 1950s until recently. Lead is a heavy, ductile metal that is commonly found in association with organic compounds, as well as oxides, salts, or as metallic lead. Sources of exposure to lead are through paints, dust, and soil. Wastes containing levels of lead exceeding the Total Threshold Limit Concentration (T TLC) of 1,300 micrograms per kilogram or the soluble Total Lung Capacity (TLC) of 5.0 milligrams per liter are defined as hazardous under 40 CFR 261 and applicable to State regulations.

For over 50 years, hazardous materials and wastes have been handled with varying levels of care and concern at Edwards AFB. Past hazardous materials/waste handling practices considered standard for the industry and routinely used before the adoption of more stringent Federal and State laws and regulations often resulted in contamination of the environment. These practices have resulted in known and potential contamination at Edwards AFB, and can generally be classified into five categories (AFFTC 1999a):

- a. Use of tanks, pipelines, and storage facilities that resulted in spills and leaks of fuels and hazardous spills;
- b. Use of cleaning agents (solvents, corrosives) and coating-related compounds (e.g., paints, thinners, strippers, plating material);
- c. Use of sanitary landfills and hazardous waste disposal areas;
- d. Use of stormwater retention ponds, evaporation ponds, and test stand catch basins for wastewater and surface runoff collections; and
- e. Use of fire training, where fuels and other flammable liquids were ignited for developing or practicing firefighting techniques.

At Edwards AFB, EM has been engaged in the ERP cleanup process since the 1980s. This program addresses the environmental contamination created by past practices, and includes identification, characterization, and remediation of site contamination, as necessary. In September 1990, the Base was placed on the U.S. EPA's National Priorities List (NPL). As a result, the AF signed a Federal Facility Agreement (FFA) that established a procedural framework to address the provisions of the *Comprehensive Environmental Response, Compensation, and Liability Act of 1980* (CERCLA), the *Resource Conservation and Recovery Act of 1976* (RCRA), and various State programs. It also established the process for involving Federal and State regulatory agencies and the public in the Edwards AFB remediation process (AFFTC 1999a).

Project activities would occur adjacent to the Main Base flightline and within ERP Site 71, Old South Base Facilities and Fuel Depot; ERP Site 88, Old South Base Underground Storage

Tanks 28 to 43 and 92; and ERP Site 302, CalNev JP-4 Fuel Pipeline (see Figures 3, 4, 5, and 6). The groundwater and soil within the proposed project area has been impacted by accidental releases of JP-4. The soil and groundwater was investigated under the ERP and areas of concern were identified following requirements under CERCLA. Groundwater-contaminated plumes were mapped and monitoring wells were installed to remove free product and monitor concentrations of the contaminants. The depth to the soil and groundwater contamination at these sites is approximately 20 feet below the ground surface and at a greater depth below the surface toward Rogers Dry Lake to the east. Some surface soil contamination is present at ERP Site 88; however, it is located on the southern portion of the site boundary.

The contamination at ERP Site 71 is being treated through a biovent air sparge system and ERP Site 88 is being treated through a bioventing system. A discussion of the potential to impact groundwater and/or soil remediation activities can be found in Section 3.8.3, Environmental Restoration Program Site Disturbance.

There are monitoring wells and remediation systems associated with ERP Sites 71 and 88. Contaminants at these sites include jet fuels and their constituents. Various monitoring wells associated with other ERP sites are also located in the vicinity (see Figures 3, 4, 5, and 6).

3.5 Hazardous Materials and Waste

A hazardous material is any material whose physical, chemical, or biological characteristic, quantity, or concentration may cause or contribute to adverse effects in organisms or their offspring; pose a substantial present or future danger to the environment; or result in damage to or loss of equipment, property, or personnel.

Hazardous wastes are those substances that have been “abandoned, recycled, or are inherently wastelike” and (because of their quantity, concentration, or characteristics) have the potential to cause an increase in mortality or serious irreversible illness, or pose a substantial hazard to human health and/or the environment if improperly treated, stored, transported, and/or discarded.

Solid waste refers to nonhazardous garbage, refuse, sludge, and any other discarded solid material resulting from residential, commercial, and industrial activities or operations. Solid waste can be classified as construction/demolition, nonhazardous recyclable, or nonhazardous nonrecyclable waste.

For purposes of this analysis, hazardous material and hazardous waste are those substances that are regulated by CERCLA and RCRA, respectively.

3.5.1 Regulatory Requirements/Guidance

The RCRA (42 USC 6901) is administered by the U.S. EPA. The Act regulates the handling, transport, storage, treatment, and disposal of solid and hazardous waste. It places responsibility for hazardous waste on the facilities generating the waste and requires them to meet various standards regarding personnel training, facility inspections, waste identification and analysis, emergency response planning, and record keeping.

The CERCLA (42 USC 9601) provides broad Federal authority to respond directly to releases or threatened release of hazardous substances that may endanger public health or the environment. The Act authorizes short-term removal actions and long-term remedial response action. The Act establishes prohibitions and requirements concerning, closed and abandoned hazardous waste sites, provides for liability of persons responsible for release of hazardous waste at these sites, and establishes a trust fund to provide for cleanup when no responsible party could be identified.

Air Force Instruction 32-7042, *Solid and Hazardous Waste Compliance*, implements Air Force Policy Directive (AFPD) 32-70, *Environmental Quality*. The Instruction identifies compliance requirements for all solid and hazardous waste, except radioactive waste.⁶ In the United States and its territories, this guidance is intended to be used with applicable Federal, State, and local standards for solid and hazardous waste. Specifically, it contains requirements for solid and hazardous waste characterization, training, accumulation, turn-in and disposal, as well as procedures for managing disposal contracts, inspections, permits, and record keeping.

Air Force Instruction 32-7086, *Hazardous Materials Management*, establishes procedures and standards that govern the management of hazardous materials throughout the AF. The Instruction applies to all AF personnel who procure, use, or dispose of hazardous materials.

Air Force Flight Test Center Instruction 32-19, *Hazardous Material Management Process*, ensures the AFFTC remains in compliance with all applicable Federal, State, local, and AF regulations and laws regarding hazardous materials management. The Instruction involves the use of information systems and positive control of hazardous material to minimize waste disposal. The hazardous material processes would be reviewed by the workplace supervisor, EM, Ground Safety, and Bioenvironmental Engineering to ensure the least occupationally and environmentally hazardous materials are used. All hazardous material transactions would occur using the most current automated data system fielded for use at Edwards AFB.

The *Edwards Air Force Base Hazardous Waste Management Plan Number 32-7042* (HWMP) (AFFTC 1999a) supports AF directives and is intended to ensure compliance with applicable Federal, State, and local regulations. The objective of the HWMP is to provide sufficient administrative direction and instructions for originators of RCRA and non-RCRA wastes to properly characterize, package, label, store, treat, handle, and transport hazardous waste at Edwards AFB. The goals are to ensure compliance with the applicable Federal, State, and local hazardous waste regulations; simplify administrative procedures; and reduce pollution and environmental impacts through improved waste management practices.

The *Edwards Air Force Base Solid Waste Management Plan* (AFFTC 1999b) describes EM's functional management of municipal solid waste disposal and recycling on Edwards AFB. The purpose of the Plan is to comply with Federal, State, and local regulations and AF policy and guidance on the management of nonhazardous municipal solid waste.

The Federal *Emergency Planning and Community Right-to-Know Act of 1986* (EPCRA) (42 USC 11001-11050) has specific reporting requirements that must be followed in the event of

⁶ The applicable solid waste regulations are in Subtitle D of Title 40, Code of Federal Regulations (CFR) Parts 240 to 244, 257, and 258; for hazardous waste, the applicable regulations are in Subtitle C, 40 CFR 260–272.

a release to the environment of hazardous or extremely hazardous substances, as designated under CERCLA. An inventory of hazardous substances released or used in excess of specified threshold quantities must be submitted annually to the responsible State agency (i.e., Certified Unified Program Agency [CUPA] and State Emergency Planning and Response Commission [SEPRC]). An inventory of accidental toxic releases in excess of specified threshold quantities must be reported directly to the California Environmental Protection Agency (Cal/EPA). Under EPCRA, specific storage requirements would also apply to handlers of hazardous materials.

The *Pollution Prevention Act of 1990* (PPA) (42 USC 13101–13109), established a national policy for pollution prevention through source reduction and recycling. The PPA calls for the establishment of a nationwide source reduction program and a strategy for quantifying source reduction efforts. The AF has incorporated this national policy into operations and acquisition programs, as directed in AFI 32-7080, *Pollution Prevention Program*, which requires application of the following PPA-prioritized hierarchy of pollution prevention approaches:

- a. Prevent or reduce pollution at the source whenever feasible;
- b. Recycle pollution in an environmentally acceptable manner that cannot feasibly be prevented;
- c. Treat pollution that cannot feasibly be prevented or recycled; and
- d. Dispose of pollution into the environment only as a last resort.

3.5.2 Hazardous Materials

The types of hazardous materials most commonly used during construction projects include acids, corrosives, caustics, glycols, compressed gases, paints and paint thinners, solvents, sealants, adhesives, cements, caulking, fire retardant, and hot asphalt (140 degrees Fahrenheit or greater).

Prior to bringing any new hazardous material on Base, contractors are required to provide a copy of the relevant material safety data sheet (MSDS) to Bioenvironmental Engineering, who maintain a master hazardous material inventory list for Edwards AFB with all listed MSDSs.⁷ All organizations and contractors are required to maintain strict inventories of all hazardous materials. Furthermore, organizations are also required to reduce the quantity of hazardous materials used or replace them with nonhazardous material, if possible, as part of the Pollution Prevention Program. Guidelines used by Edwards AFB include AFI 32-7086, *Hazardous Materials Management*; AFI 32-7042, *Solid and Hazardous Waste Compliance*; and AFFTCI 23-1, *Hazardous Material Management Program*.

In response to AFI 32-7080, the AFFTC has prepared the *Edwards Air Force Base Pollution Prevention Plan* (AFFTC 1995b). This Plan contains eight program elements, six of which are required under AFI 32-7080. These elements include: ozone depleting substances, EPA-17 Industrial Toxic Project Chemicals, hazardous waste minimizations, municipal solid waste

⁷ Occupational Safety and Health Administration regulations (29 CFR 1910.1200) require MSDSs for all hazardous chemicals used on Base. The MSDS identifies a chemicals identity, its physical and health hazard information, safe handling and use procedures (including exposure control measures), and product use warnings. Air Force Occupational Safety and Health Standard 48-21, *Air Force Hazard Communication Program*, reestablishes the minimum requirements for an effective hazard communication program for personnel who use or produce hazardous chemicals.

minimizations, affirmative procurements, energy conservation, VOC air emission reductions, and Toxic Release Inventory (TRI). Toxic Release Inventory is required under EO 12856, *Federal Compliance with Right-to-Know Laws and Pollution Prevention Requirements*, which requires Federal agencies to comply with the amended PPA and the EPCRA.

The AFFTC uses Pollution Prevention Opportunity Assessments (PPOAs) in order to identify existing processes used, hazardous chemicals required for those processes, and recommended actions needed to eliminate and/or reduce pollution. The Pollution Prevention Plan acknowledges AF requirements for the use of specific hazardous materials that would otherwise be targeted for reduction/elimination.

3.5.3 Hazardous Waste

The use of hazardous materials results in the generation of hazardous waste (e.g., paint waste, used oil, contaminated rags) that requires proper handling and disposal. The U.S. EPA enforces RCRA, which provides guidelines for the generation, storage, transportation, and disposal of hazardous waste. The Cal/EPA enforces hazardous waste laws as stated in Title 22 CCR Chapters 10 through 20 and the California State Health and Safety Code (Section 25100). The EM administers all hazardous waste accumulation at Edwards AFB. Guidelines used by Edwards AFB include the HWMP (AFFTC 1999a), which was prepared IAW AFI 32-7042, *Solid and Hazardous Waste Compliance*. The Plan establishes procedures to achieve compliance with Applicable or Relevant and Appropriate Requirements (ARARs) for hazardous waste management, except munitions, explosives, biohazard, and radioactive waste.⁸ The Plan contains requirements for solid and hazardous waste characterization, training, accumulation, turn-in and disposal, as well as procedures for inspections, permits, and record keeping.

The storage of hazardous waste begins at the point of generation. An initial accumulation point (IAP) is an area at or near the point of hazardous waste generation where hazardous wastes may be accumulated until they are sent to either an accumulation site (ACCS) (known more commonly as a 90-day accumulation point) or the Hazardous Waste Storage Facility (HWSF) (a facility permitted to store hazardous wastes for up to 1 year). Any new IAP and its proposed location must be approved by and coordinated with EM in order to minimize the threat to human health and the environment. An IAP has fewer operational requirements than an ACCS, provided the following restrictions in 22 CCR 66264.34 are met:

- a. Hazardous waste accumulation/containerization is accomplished only by knowledgeable and trained IAP personnel under controlled circumstances (waste addition logs are used to identify what hazardous waste is added to a container);
- b. Hazardous waste accumulation is not more than 55 gallons per wastestream of hazardous waste or 1 quart of acutely or extremely hazardous waste; and
- c. Hazardous waste may be accumulated for 270 days or until either of the previously listed restrictions are exceeded.

An IAP must also comply with other operational requirements that ensure wastes are managed IAW applicable regulations, and as specified in the HWMP.

⁸ The applicable hazardous waste regulations are in Subtitle C, 40 CFR 260–272.

An ACCS either receives hazardous waste generated at an IAP or is used to accumulate wastestreams in lieu of using an IAP (i.e., when either the volume or accumulation time restrictions applicable to an IAP cannot be met). In either case, wastes accumulated at an ACCS are subsequently sent to the HWSF. Like an IAP, any new ACCS and its proposed location must be approved by and coordinated with EM in order to minimize the threat to human health and the environment. Unlike an IAP, hazardous waste may only be stored at an ACCS for up to 90 days. In addition, the ACCS has more rigorous operational requirements that must be followed in order to ensure that wastes are managed IAW applicable regulations and as specified in the HWMP.

The HWSF at Edwards AFB is the final stage for on-Base management of hazardous waste. The HWSF is managed by EM under a service contract and operates as a hazardous waste storage facility in Building 4916. This facility is permitted to temporarily store (for up to 1 year) hazardous waste IAW 22 CCR 66270.14 under a Part B Permit. Wastes accumulated at IAPs and ACCSs throughout the Base are transported to the HWSF prior to shipment off Base for treatment, storage, or disposal. Federal standards require shipments of hazardous waste to be labeled, marked, and placarded IAW United States Department of Transportation (DOT) regulations 49 CFR, *Transportation*, Chapter I, Subchapters B and C.

The transportation of hazardous waste is governed by DOT regulations that specify procedures for transporting these materials on public highways (49 CFR 100–199; 40 CFR 260–299; and 22 CCR Division 4.5, Chapter 13, *Standards Applicable to Transporters of Hazardous Waste*). However, these State and Federal DOT regulations do not apply to the transport of hazardous materials and/or hazardous wastes between points on Base.

3.5.4 Solid Waste

Edwards AFB operates a nonhazardous (municipal solid waste) landfill within the Main Base area and is in the process of establishing a processing center for construction, demolition, and inert debris. If this location is approved and inert debris processing is authorized at this location, Civil Engineering would specify the area at the processing center where the material could be stockpiled. Since the material from Runway 04/22 has been identified as having ASR, the material would be segregated from other inert debris at this location. If this location is not approved at the time of project activities, CDW disposal would then be required at an approved off-Base State-licensed landfill.

The Base actively participates in a recycling program. A contractor operates the program under contract with Edwards AFB with program oversight provided by EM. Some waste generated from the proposed action could be recycled (e.g., concrete, asphalt, paving, metals).

3.6 Biological Resources

Naturally occurring organisms, the physical and biological aspects of their environment, and the relationships between them make up biological resources. Biological resources include native and introduced plants that comprise various vegetative habitats, the animals that are found in such habitats, and the physical areas that support plant and wildlife populations.

Edwards AFB contains and manages biological resources that are typical of a desert environment. These include animal and plant species (including the associated habitats of each), floodplains, and watersheds.

3.6.1 Regulatory Requirements/Guidance

The *Endangered Species Act of 1973* (ESA) (16 USC 1531–1544) provides a framework for the protection of endangered and threatened species. Federal agencies may not jeopardize the existence of listed species, which includes ensuring that actions they authorize, fund, or carry out do not adversely affect the species or adversely modify designated critical habitats. Under the ESA, all Federal departments and agencies must utilize their authorities, as appropriate, to promote the recovery of listed species. In addition, the ESA prohibits all persons, including Federal agencies, from harming or killing (taking) individuals of a listed species without authorization. While Federal agencies must consult with the United States Fish and Wildlife Service (USFWS) or National Marine Fisheries Service when their activities may affect listed species, projects cannot be stopped unilaterally by the Services; however, for any anticipated take to be authorized, applicable measures to minimize the take, as outlined in the consultation, must be followed.

The *Migratory Bird Treaty Act* (MBTA) of 1918 (16 USC 703–712), as amended, provides for Federal protection of all migratory bird species and their active nests or eggs. Permits are required to remove these birds and their nests from their roosting and nesting areas.

The *Sikes Act* (16 USC 670a-670o), as amended, provides for cooperation between the Departments of the Interior and Defense and State agencies in planning, developing, and maintaining fish and wildlife resources on military reservations throughout the United States.

The *California Endangered Species Act* (CESA) (California Fish and Game Code Section 2050 et seq.) generally parallels the main provisions of the Federal ESA and is administered by the California Department of Fish and Game (CDFG). Under the CESA, the term “endangered species” is defined as a species of plant, fish, or wildlife that is in serious danger of becoming extinct throughout all, or a significant portion of its range, and is limited to species native to California. The CESA establishes a petitioning process for the listing of State threatened or endangered species, and the CDFG is required to adopt regulations for this process. The CESA prohibits the taking of State-listed species except as otherwise provided in State law. Unlike the Federal ESA, the CESA applies prohibitions to species petitioned for State listing (e.g., State candidates).

The *Animal Damage Control Act* (ADCA) (7 USC 426–426b), as amended, is administered by the Secretary of Agriculture and provides broad authority for investigation and control of mammalian predators, rodents, and birds.

Department of Defense Directive (DODD) 4700.4, *Natural Resources Management Program*, prescribes policies and procedures for an integrated management program of natural resources on DOD property. Enforcement of laws primarily aimed at protecting natural resources and recreation activities that depend on natural resources is an integral part of a natural resources program and shall be coordinated with, or under the direction of, the natural resources manager for the affected area.

Air Force Instruction 32-7064, *Integrated Natural Resources Management*, implements AFPD 32-70, *Environmental Quality*, and DODI 4715.3, *Environmental Conservation Program*. Air Force Instruction 32-7064 explains how to manage natural resources on AF property in compliance with Federal, State, and local standards. The Integrated Natural Resources Management Plan (INRMP) is a key tool for managing the installation's natural resources.

3.6.2 Animal Species

The burrowing owl is currently a Federal and California species of concern and is also protected under the auspices of the MBTA. It is a small, ground-dwelling bird with a round head that lacks the tufts of feathers, which are often referred to as ear tufts. It has white eyebrows, yellow eyes, and long stilt-like legs. Burrowing owls are found in open, dry grasslands, agricultural and range lands, and various desert habitats (Haug, E.A. and L.W. Oliphant 1990). On Edwards AFB, burrowing owls are known to inhabit man-made cover features such as irrigations pipes and culverts along graded road shoulders, as well as natural cover features such as animal (e.g., desert tortoise, desert kit fox, or badger) burrows or dens.

Common animal species found in the project area include the black-tailed jackrabbit (*Lepus californicus*), desert cottontail (*Sylvilagus audubonii*), deer mouse (*Peromyscus maniculatus*), grasshopper mouse (*Onychomys torridus*), little pocket mouse (*Perognathus longimembris*), Merriam's kangaroo rat (*Dipodomys merriami*) and Antelope ground squirrel (*Ammospermophilus leucurus*). For a list of common animals found at Edwards AFB, see the *Biological Resources Environmental Planning and Technical Report Basewide Vegetation and Wildlife Surveys and Habitat Quality Analysis* (Mitchell et al. 1993).

3.6.3 Plant Species

The proposed project is located within potential habitat for alkali Mariposa lily. Alkali Mariposa lily is a Class 1B species and considered rare, threatened, or endangered in California and elsewhere by the California Native Plant Society. Alkali Mariposa lily is a spring-flowering, erect, bulb-forming perennial in the lily family (Liliaceae) found most commonly in clay pans and dunes within halophytic phase saltbush scrub communities. The three petals are wedge-shaped and lavender with purple veins and may reach 10 to 50 centimeters in height.

3.7 Cultural Resources

Cultural resources are defined by AFI 32-7065, *Cultural Resources Management*, as any historical, archaeological, or American Indian artifacts and properties of interest. Cultural resources at Edwards AFB include archaeological resources (including those from prehistoric and historic periods), historic period resources (including historic period structures and objects), and traditional cultural places.

As of June 2004, over 3,041 archaeological sites had been identified on Edwards AFB. Of these, over 1,662 sites represent the prehistoric period, and over 1,379 date to the historic period. Prehistoric period sites include villages, temporary camps, rock shelters, milling stations, lithic deposits, quarries, cremations, rock features, and rock art. Historic period archaeological sites include refuse deposits, rock cairns, railroad grades, roads and trails, abandoned mines and homesteads, buildings and facilities, rock alignments, wells, and military sites. Of these, 587 sites

have been evaluated for listing on the National Register of Historic Places (NRHP); 103 of these sites have been found eligible or potentially eligible for listing on the NRHP either on individual merit or as contributing elements of historic districts. There is one National Historic Landmark on Edwards AFB, which is in the northern portion of Rogers Dry Lake.

3.7.1 Regulatory Requirements/Guidance

The *National Historic Preservation Act of 1966* (NHPA) (16 USC 470 et seq.), as amended, provides for the establishment of the NRHP and authorizes the establishment of criteria to determine the eligibility of cultural sites for listing on the NRHP. Section 106 of the NHPA requires Federal agencies to evaluate the effects of their activities and programs on eligible cultural resources (which include prehistoric and historic archaeological resources, historic resources, and traditional cultural places). Section 110 of the NHPA directs Federal agencies to undertake actions necessary to minimize harm to cultural resources under their ownership or control, or affected by their activities and program. Compliance, with 16 USC 470 et seq., NHPA; 36 CFR Part 800, *Protection of Historic Properties*; and AFI 32-7065, *Cultural Resources Management*, at Edwards AFB is coordinated by the Base Historic Preservation Office (BHPO).

The *Native American Graves Protection and Repatriation Act* (NAGPRA) (25 USC 3001 et seq.) requires Federal agencies and institutions (e.g., museums) that receive Federal funding to inventory their collections of American Indian remains, funerary objects, sacred objects, and objects of cultural patrimony. American Indians must be given the opportunity to reclaim these items. The Act requires halting excavation and consulting with representatives of local American Indian groups if a burial is encountered in the course of archaeological or other excavations. The Act also makes it illegal for anyone to buy or sell American Indian remains or sacred objects.

The *Archaeological and Historic Preservation Act of 1974* (16 USC 469) requires all agencies to report to the Secretary of the Interior if any of their projects may cause the loss of “significant scientific, prehistorical, historical, or archaeological data;” gives American Indians the choice of recovering threatened data themselves or asking the Department of the Interior to do it for them; and it authorizes them to transfer up to 1 percent of the cost of the project to the Department of the Interior to support salvage.

The *American Indian Religious Freedom Act* (AIRFA) (42 USC 1966) recognizes and protects the religious freedoms of American Indians as an integral part of their culture, tradition, and heritage. The Act preserves the right of access by American Indians to sacred sites, to use and possess sacred objects, and to freely worship through ceremonial and traditional rites.

3.7.2 Prehistoric Archaeological Resources

A number of American Indian groups are known ethnographically to have used the Antelope Valley, including Kawaiisu, Tataviam, Kitanemuk, and Vanyume or Desert Serrano. Additional information on these groups can be found in the *Cultural Resources Overview and Management Plan of Edwards AFB, California, Volume 1, Overview of the Prehistoric Cultural Resources* (Earle et al. 1997).

Prehistoric period sites include villages, temporary camps, rock shelters, milling stations, lithic deposits, quarries, cremations, rock features, and rock art. There is one prehistoric cultural resources site (archaeological site) within the proposed project area. This site has been previously evaluated and determined eligible for the NRHP.

3.7.3 Historic Resources

Historic land use in the Antelope Valley was limited to exploration until the middle of the 19th century. During the late 19th and early 20th centuries, land use activity in the area that is now part of Edwards AFB, included mining and the development of railroads, ranches, and homesteads.

The town of Muroc, located on today's Main Base Flightline just east of the Control Tower, was founded in 1909 by Clifford and Ralph Corum when they filed on Homestead No. 027819. The Corums sold land to other homesteaders for \$1 an acre. They established a general store, school, and post office. The town name of Muroc is the Corum name spelled backwards and was selected when the post office was established in 1910. Muroc was a railroad town associated with the Atchison, Topeka, and Santa Fe Railroad that ran from Mojave to Barstow across the dry lakebed. The town of Muroc existed until the early 1950s when the USAF purchased the land to expand Edwards AFB.

The area was first used by the military in 1928, and a bombing and gunnery range was formally established at Rogers Dry Lake in 1934. Edwards AFB, then known as Hap Arnold's Camp and later the Muroc Bombing and Gunnery Range, was established in 1934 as a bombing range (Wessel and Wessel 1990). The Muroc Bombing and Gunnery Range was operated out of a tent camp on the east Shore of Rogers Dry Lake by March Field, Riverside, California.

In 1941, the Muroc Bombing and Gunnery Range headquarters moved to the west shore of Rogers Dry Lake (modern South Base), immediately south of the town site of Muroc. In 1942, Muroc Bombing and Gunnery Range was made a separate post, independent of March Field, and was renamed Muroc Army Air Base (Young 1987). It was renamed again in 1943, becoming Muroc Army Air Field. The Base provided advanced fighter and bombardment training for units prior to their deployment overseas during World War II and continued operations as a bombing and gunnery range.

In 1942, a separate facility, Muroc Flight Test Base (now known as North Base), was established to house and test the Bell XP-59A Airacomet, the first American jet aircraft. Later, in 1943, the SP-80 program moved into the test Base. The Lockheed XP-80 Shooting Star became the first American jet aircraft to see combat (Hudlow 1995).

In 1947, the bombing range, by then known as Muroc Army Air Field, was combined with Muroc Flight Test Base to form Muroc AFB (Hudlow 1995). The Base's bombing range function was largely abandoned after World War II in order to continue flight test programs. In 1949, Muroc AFB was renamed Edwards AFB in commemoration of Captain Glen W. Edwards, who was killed flying second seat to Major Daniel Forbes in a Northrop YB-49 Flying Wing (Young 1987). In the mid-1950s, the majority of Base operations moved to new facilities constructed at what is now Main Base (Young 1984). Additionally, associate organizations at the

rocket laboratory and Jet Propulsion Laboratory (JPL) developed rocket engines for the country's manned and unmanned space programs (Hudlow 1995; Komporlides et al. 1996).

Evidence of the Base's military history can still be found. The Range contains several examples of World War II bombing targets, and the hangar that housed the XP-59A program still stands at North Base. Other examples include the X-15 complex where the X-15's engines were tested, the loading pit for the Bell X-1, and Test Stand 1A that was used to test the rocket engines that took Americans to the moon. Many of these facilities are still used today to test the Nation's next generation of historic aircraft and rockets.

There are three historic period archaeological sites within the proposed project area. One of these sites, the township of Muroc, has been previously evaluated and determined eligible for the NRHP (Earle et al. 1998).

3.8 Geology and Soils

Geologic resources consist of naturally formed minerals, rocks, and unconsolidated sediments. Soil refers to the uppermost layers of surficial geologic deposits and is developed by the weathering of those deposits. Concerns associated with the geologic setting at Edwards AFB, which could either affect or be affected by a proposed project, include topography, ERP site disturbance, seismicity, and land subsidence.

3.8.1 Regulatory Requirements/Guidance

The CERCLA (42 USC 9601) was enacted by Congress on 11 December 1980. This Act provides broad Federal authority to respond directly to releases or threatened release of hazardous substances that may endanger public health or the environment. The Act authorizes short-term removal actions and long-term remedial response actions. The Act establishes prohibitions and requirements concerning closed and abandoned hazardous waste sites; provides for liability of persons responsible for releases of hazardous waste at these sites; and establishes a trust fund to provide for cleanup on non-DOD property when no responsible party can be identified.

The RCRA (42 USC 6901) was enacted into law in 1976 and is administered by the U.S. EPA. It regulates the handling, transport, storage, treatment, and disposal of solid and hazardous waste. It places responsibility for hazardous waste on facilities generating the waste and requires them to meet the various standards regarding personnel training, facility inspections, waste identification and analysis, emergency response planning, and record keeping.

In September 1990, the AF, along with the U.S. EPA, Region IX; the California Department of Health Services (now referred to as the Cal/EPA, Department of Toxic Substances Control [DTSC] and the California Regional Water Quality Control Board [RWQCB], Lahontan Region), signed an FFA. The FFA requires compliance with the *National Oil and Hazardous Substances Pollution Contingency Plan* (40 CFR 300), CERCLA, RCRA, and applicable State laws. Under Section 6.2 of the FFA, the AF agreed to undertake, seek adequate funding for, fully implement, and report on the following tasks: remedial investigation of sites; Federal and State Natural Resource Trustee Notification and Coordination for the sites; feasibility studies for all sites; all response actions for the sites; and operation and maintenance of response actions at the site.

The purpose of the *Alquist-Priolo Earthquake Fault Zoning Act* (California Public Resources Code, Division 2, Chapter 7.5, Section 2621, et seq.) is to provide for the adoption and administration of zoning laws, ordinances, rules, and regulations by cities and counties in implementation of the general plan that is in effect in any city or county. The Legislature declares that this Act is intended to provide policies and criteria to assist cities, counties, and State agencies in the exercise of their responsibility to prohibit the location of developments and structures for human occupancy across the trace of active faults. Further, it is the intent of this Act to provide the citizens of the State with increased safety and to minimize the loss of life during and immediately following earthquakes by facilitating seismic retrofitting to strengthen buildings, including historical buildings, against ground shaking.

3.8.2 Topography

The United States Department of Agriculture (USDA), Natural Resource Conservation Service (NRCS), has completed a soil survey of Edwards AFB for the USACE. The *Grazing and Cropland Management Plan for Edward Air Force Base, California* (USACE 1997) describes results of the soil survey that was conducted by the USDA. Based on this survey, the soils at Edwards AFB can be characterized as predominantly alkaline, consisting of loams, sandy loams, and loamy sands, all of which are susceptible to wind and water erosion. According to the Interim, *Soil Survey of Edwards Air Force Base, California*, (USDA Soil Conservation Service [SCS] 1998), the soils at Edwards AFB is given erosion hazard ratings of slight-to-severe for wind erosion and slight-to-moderate for water erosion.

The surface of the flightline is dominated by the alluvial sediments that are sandy loam in texture. The flightline is located near the edge of the playa/lakebed. Main Base is located in the playa boundary zone where the granitic bedrock outcrops to the west and underlies the extensive playa deposits of Rogers Dry Lake on the east. The lacustrine and alluvial deposits overlying bedrock in the Main Base area vary considerably both laterally and vertically. Depth to bedrock can range from surface outcroppings to more than 80 feet in the playa deposits on the eastern edge of the Main Base area. The north end of Rogers Dry Lake has relatively shallow depth to bedrock.

3.8.3 Environmental Restoration Program Site Disturbance

Soil and groundwater are susceptible to contamination. Releases of hazardous chemicals, such as petroleum products and solvents, have created soil and groundwater contamination at military installations. Contaminated soil and/or groundwater may require physical removal or extensive remediation to ensure the protection of public health and safety.

The ERP was established to identify, investigate, assess, and clean up hazardous waste at former disposal sites on the Base in compliance with CERCLA. Under the ERP, a Preliminary Assessment was conducted at Edwards AFB to locate potential areas of concern (AOCs) that may have resulted from past activities on the 301,000-acre Base.

Remediation efforts usually involve extraction and/or monitoring wells that are drilled to groundwater, or deeper, and are located throughout the contaminated groundwater plume. Extraction wells can extract both groundwater and air from the unsaturated zone. They are connected by a series of underground or aboveground pipes that convey air, water, and

compressed air (for pneumatic pumps located within the wells). The extracted material is then piped to a treatment compound where equipment is located to treat the incoming vapors and liquids. The treatment compound will have some connections for electricity, natural gas, and sewer hookups. Monitoring wells were installed to observe the condition of the groundwater within a specific location. Well locations are usually selected on the basis of known or expected hydrologic, geologic, and water quality conditions and the location of pollutant or contaminant sources. The Environmental Restoration Division schedules and conducts remediation efforts for the ERP. Many of the systems are in construction or planning phases. Any project or activity planned in an ERP site undergoing or scheduled for remediation would be scheduled to avoid conflicts with ERP timelines and requirements. This process ensures that equipment is not damaged and program efforts are not negatively affected by the proposed project or activity.

The contamination at ERP Sites 71 and 88 are being treated through bioventing systems. Bioventing is an *in situ* remediation technology that uses indigenous microorganisms to biodegrade organic constituents adsorbed to soils in the unsaturated zone. Soils in the capillary fringe and the saturated zone are not affected. In bioventing, the activity of the indigenous bacteria is enhanced by inducing air (or oxygen) flow into the unsaturated zone (using extraction or injection wells) and, if necessary, by adding moisture. In addition, excavation of contaminated soil is planned for Site 88. Excavation at Site 71 will be scheduled for an outyear (Hobbs 2004).

A discussion of the potential exposure of personnel to contaminated soil and/or groundwater can be found in Section 4.4.1.1, Exposure Hazards.

3.8.4 Seismicity

The geologic and structural development of the vicinity surrounding Edwards AFB has been measurably affected by tectonic activity. The Mojave Structural Block is wedged between two major intersecting shear zones; the northeast trending Garlock Fault, which controls the trend of the Tehachapi Mountains to the northwest of Edwards AFB, and the northwest trending San Andreas Fault system, which bounds the San Gabriel Mountains to the south. Both fault zones have had substantial activity in the Quaternary period. The San Andreas Fault zone is the more dominant of the two, with a known length of about 600 miles and right-lateral displacement of up to 350 miles. The Garlock Fault zone is traceable for more than 150 miles and has left-lateral displacement (Weston 1986).

Like much of Southern California, Edwards AFB is subject to earthquake activity and associated seismic hazards. At least eight minor faults are known, or are suspected due to their trends, to be present within the boundaries of Edwards AFB; however, no fault has been active in the last 11,000 years. A local fault seismicity map shows the surface traces of these faults (Figure 12).

3.9 Socioeconomics

Socioeconomic resources are the economic, demographic, and social assets of a community. Key elements include fiscal growth, population, employment, housing, schools, and environmental justice. For the purpose of this EA, the boundary of the socioeconomic environment is defined by those counties or portion of counties in which the proposed action would occur. The economic

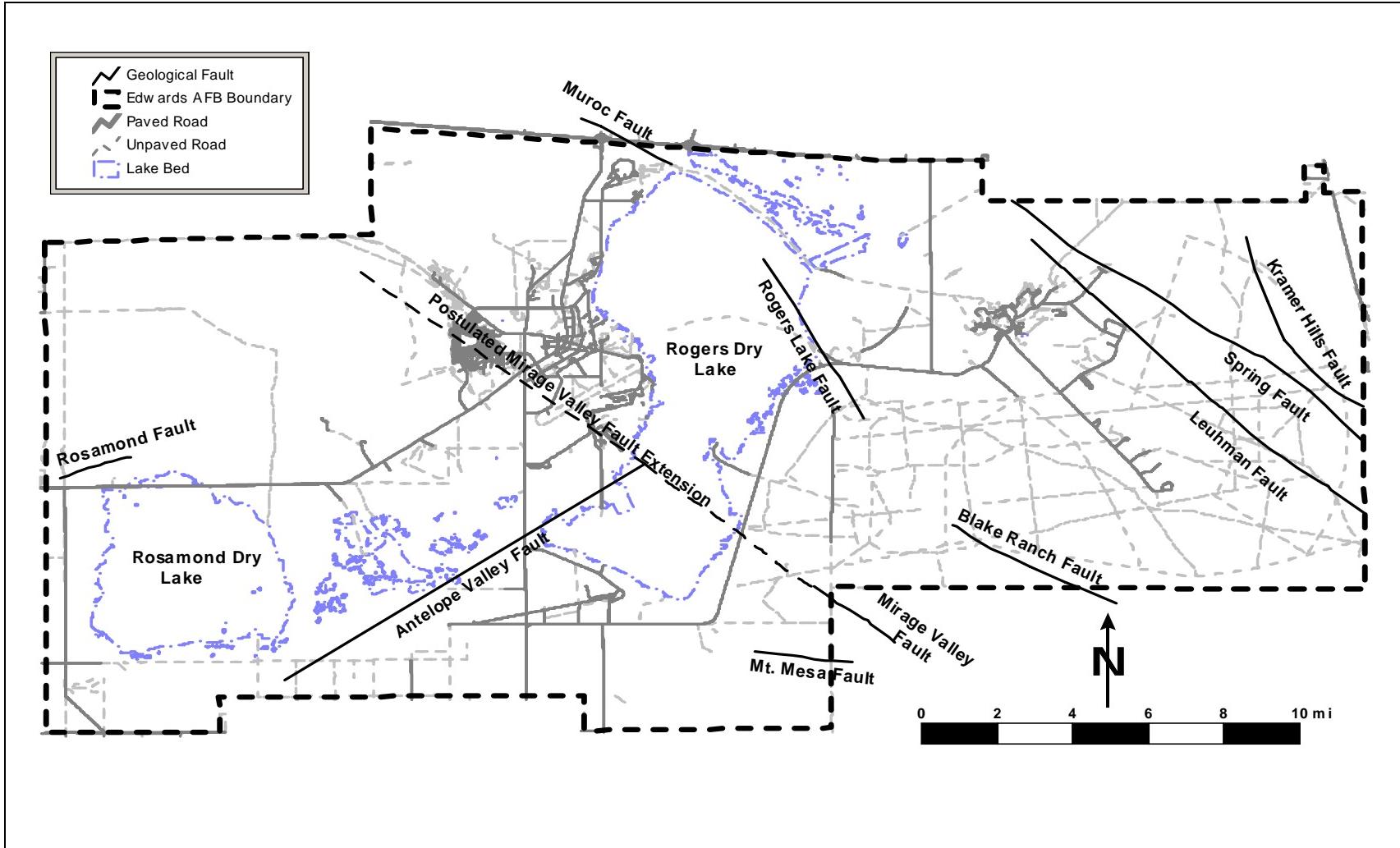


Figure 12 Local Faults Seismicity Map

impact region (EIR) includes all areas within this boundary. The EIR for an impacted community is fundamentally important to the analysis because it defines the area in which changes in fiscal growth, population, labor force and employment, housing stock and demand, and school enrollment would be assessed. The EIR for Edwards AFB is that area located within 75 miles of the Main Base, and includes portions of Los Angeles, Kern, and San Bernardino counties. However, a majority of potential socioeconomic impacts from Base activities would be expected to occur within the Antelope Valley area (Figure 13).

3.9.1 Fiscal Growth

Edwards AFB makes a substantial contribution to the economic status of the surrounding communities within the Antelope Valley of California. For FY02, the estimated cumulative economic impact from Edwards AFB's annual operating expenditures including salaries, DOD acquisitions, and educational assistance in the surrounding communities was approximately \$1.2 B (AFFTC 2002).

3.10 Infrastructure

Infrastructure refers to the physical components that are used to deliver something (e.g., electricity, traffic) to the point of use. Elements of the Base infrastructure system include water, wastewater, electricity, natural gas, communications lines (e.g., telephone, computer), and circulation systems (e.g., streets and railroads) that run in a network through the Base.

3.10.1 Transportation System

Edwards AFB is accessed by way of Rosamond Boulevard from the west or north, and by Lancaster Boulevard/120th Street East from the south. Primary access to Edwards AFB from the adjacent roadways is by way of three gates, each in operation 24 hours a day, 7 days a week. The gates are as follows: North, West, and South Gates. All are improved with two inbound and two outbound lanes at each gate facility (USACE and AFFTC 1994).

Internal circulation on Base is by way of paved and unpaved primary, secondary, and tertiary roads. Primary roads connect Edwards AFB components such as the flightline, Engineering and Administration, and support areas to entry points. Secondary roads connect Edwards AFB components to one another and support facilities such as commercial or housing areas. Tertiary roads are unpaved access roads or residential streets within the housing area. Lancaster and Rosamond Boulevards are the two primary roads on Main Base. These two primary roads form the spine of the Base road system, providing high-speed, high-volume access to connecting secondary and arterial roads and activity centers on Main Base. Significant secondary roads are Fitzgerald Boulevard, Forbes Avenue, Yeager Boulevard, and Wolfe Avenue.

In addition to the paved roadways, an extensive network of unimproved, dirt roadways exists, essentially equivalent to the paved network. These roads have established posted speed limits and provide access to various installation facilities and sites. Traffic is comprised of Government, contractor, and personally owned vehicles (POVs) belonging to those that live and/or work on Base. In addition, commercial vehicles deliver material to businesses and facilities in the area. Commercial and AF vehicles are used for service and construction work done in the area (e.g., repairs). Emergency vehicles require access to all buildings and roads.

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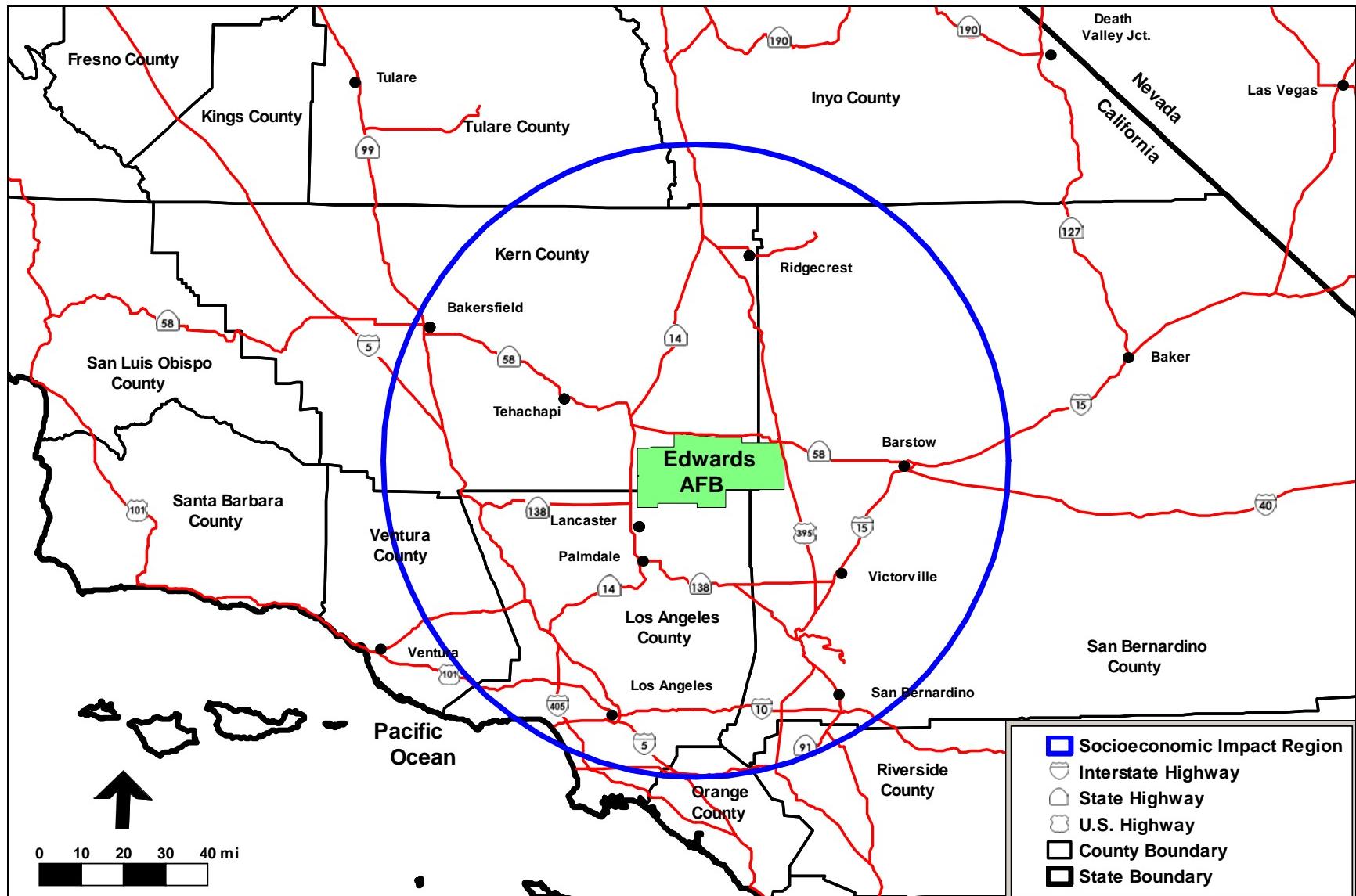


Figure 13 Socioeconomic Impact Region

Proposed ingress/egress routes for proposed project activities are shown in Figure 14 and the load capacities of the major ingress and egress roads are approximately 80,000 pounds per vehicle.

3.10.2 Utilities

Existing utility lines run in a network in the project area. Utilities that may be encountered during digging and trenching operations at the project location could include water, electrical, communications, stormwater, and/or sanitary sewer systems. Water mains are typically transiteTM (i.e., asbestos cement) pipe. Utility service lines are galvanized steel or copper pipe. Sewer lines are vitrified clay pipes that run beyond 5 feet from the buildings and are cast iron within the 5-foot line and under building slabs.

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4.0 ENVIRONMENTAL CONSEQUENCES

4.1 Land Use

4.1.1 Alternative A Impacts (Preferred Alternative)

4.1.1.1 On-Base Land Use

Construction of a new runway would be consistent with the Base General Plan. Therefore, no adverse impacts would be anticipated.

The proposed project area is currently being used as a flightline area and the new runway would use the same area for the same purpose. Therefore, no changes in the existing land use are expected. The Base General Plan addresses the deterioration of Runway 04/22 and the proposed project location as a potential site for the construction of a runway. Therefore, no adverse impacts to land use are anticipated.

4.1.1.2 Air Installation Compatible Use Zone

An AICUZ analysis of the proposed temporary runway location was completed IAW airfield design standards contained in the Unified Facilities Criteria (UFC) 3-260-01, *Airfield and Heliport Planning and Design*. The CZ and APZ for the new runway location would not contain any structures that would violate these design standards (Dufour 2004). Therefore, no adverse impacts to AICUZ are anticipated.

4.1.1.3 Noise (Annoyance)

To evaluate potential noise impacts from the location of the new runway, changes in aircraft traffic patterns to the runway were reviewed and adjustments were then made to the positioning of the 65 Ldn noise contour of Runway 04/22. Traffic patterns would be flown in such a way as to distribute air traffic between both the new as well as Runway 04/22. The overhead traffic pattern initial approach would be aligned with the new runway. However, the initial approach has always been offset to the north halfway between the fly-by line and the runway, which is where the new runway would be constructed. The initial approach alignment with the new runway would result in essentially the same ground track as has always been flown for Runway 04/22. The instrument landing system (ILS) equipment would not be relocated to the new runway. Both practice and actual IFR ILS approaches would fly the existing ground track to Runway 04/22 then would either go around at a safe altitude to pass over the construction activity or transition on short final to a landing on the new runway. Visual straight-in approaches would be aligned with the new runway. Departures from the new runway would result in a ground track offset to the north.

To evaluate the impact of aircraft noise resulting from the new runway located 2,500 feet north of the Runway 04/22, a line was drawn around the 65 Ldn noise contour of the current runway (see Figure 9). This line can be used to represent the worst-case location of the 65 Ldn contour from aircraft operations occurring on the new runway.

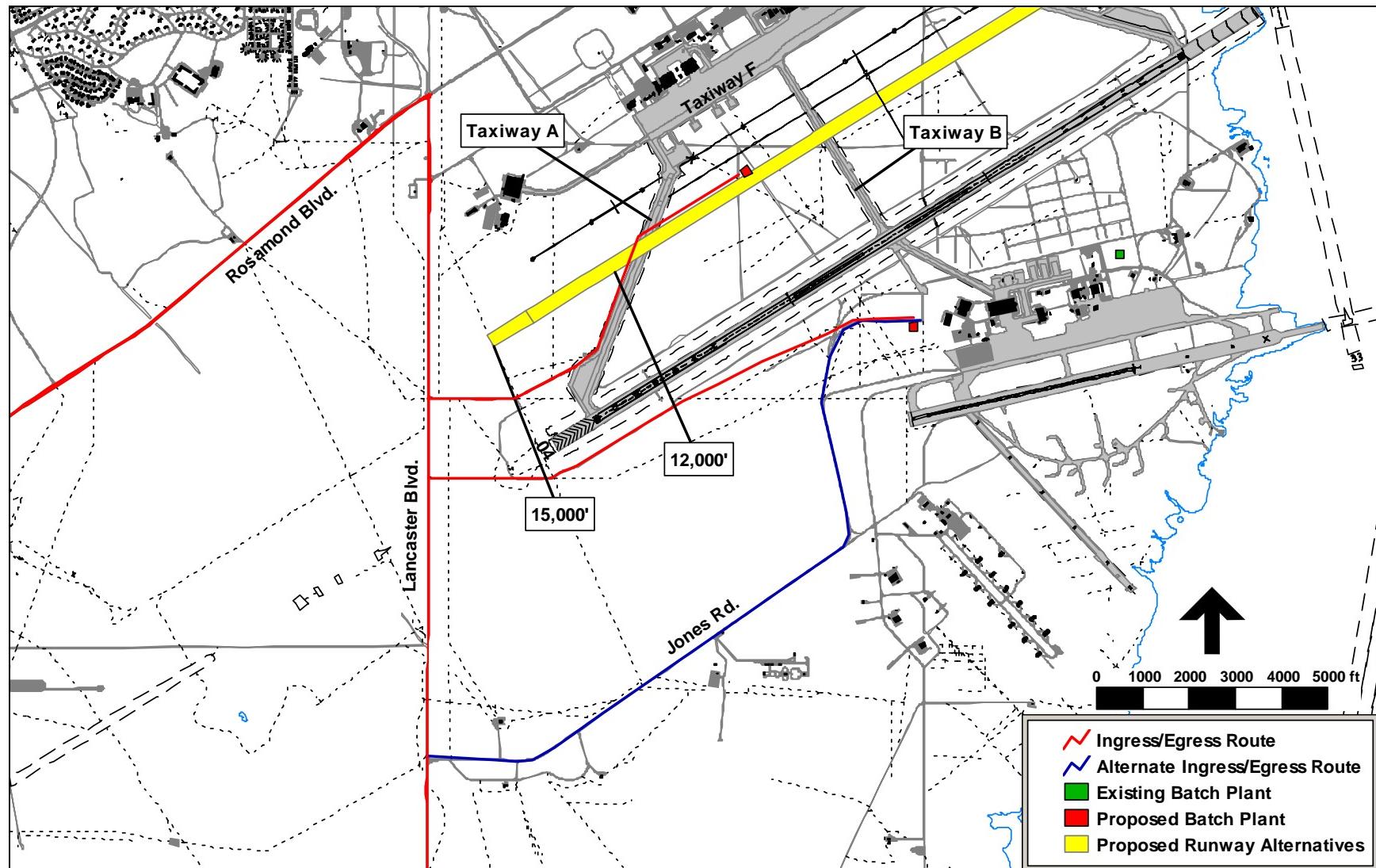


Figure 14 Proposed Ingress/Egress Routes

The 65 Ldn noise contour generated by arrival traffic would remain within boundaries of Edwards AFB. If the current 65 Ldn contour is shifted by 2,500 feet (represented by the 2,500-foot outline on Figure 15), it remains wholly contained within the boundaries of Edwards AFB. This is a worst-case evaluation based on the current noise footprint because it is likely the 65 Ldn noise contour resulting from flight operations on the new runway would be smaller at its most north-easterly extent. This would result from the different ground tracks of the ILS final approach and the visual straight-in final approach as described previously, which would distribute the noise under the flight tracks over a larger area. The new runway would not change the noise conditions that justified the current waiver for Edwards AFB from the requirement for a public AICUZ study.

The 65 Ldn noise contour generated by departure traffic would remain south of areas on Edwards AFB that could be sensitive to aircraft noise. Figure 16 shows a shift of the 65 Ldn noise contour in the direction of the new runway would not reach most noise sensitive receptors on the Base (Figure 16). While the dormitory area would be inside the 65 Ldn contour, this would not be a significant impact because residential living patterns in a dormitory area are somewhat different than in a residential housing area. Most dormitory residents would not be present during daytime hours when aircraft operations occur. Chapel 1 would also be inside the 65 Ldn noise contour; however, this would not be a significant impact because aircraft operations occur during normal business hours on weekdays and would typically not impact normal weekend chapel services. Therefore, no adverse impact is anticipated as a result of noise.

4.1.1.4 Airfield Operations

The proposed project would include construction activities adjacent to and on the flightline. All activities would be conducted IAW applicable AFIs, including those listed in Section 3.1.1, and coordinated through Airfield Management. Runway 04/22 demolition/reconstruction would be conducted incrementally around airfield operations that require the length and width of Runway 04/22. Therefore, no adverse impacts to airfield operations (e.g., first flights, shuttle landings) are anticipated.

4.1.1.5 Foreign Object Damage Control

Material or debris, such as nuts, bolts, screws, wood, trash, or pieces of concrete or asphalt may end up on the runway, taxiways, or apron as a result of construction and/or demolition activities. These objects could puncture tires, damage engines, or be blown by helicopter rotor downwash. This could cause damage to aircraft and helicopters and possible injury or death to personnel. Rotary winged aircraft, in particular, produce large quantities of rotor downwash during takeoff, landing, and hover operations. The downwash from these operations can produce large quantities of FOD if the operations occur near unstabilized surfaces, such as cleared dirt areas. However, continued implementation of standard practices and existing policies would reduce the potential for these impacts. Therefore, no adverse impact is anticipated as a result of FOD.

4.1.1.6 Direct/Indirect Effect

Construction and demolition/reconstruction activities would have a direct effect on land use through the creation of additional runway space. Construction and demolition/reconstruction activities would have an indirect effect by reducing the potential for FOD hazards and providing an on-Base runway system that would meet the standards for current and future flight test activities.

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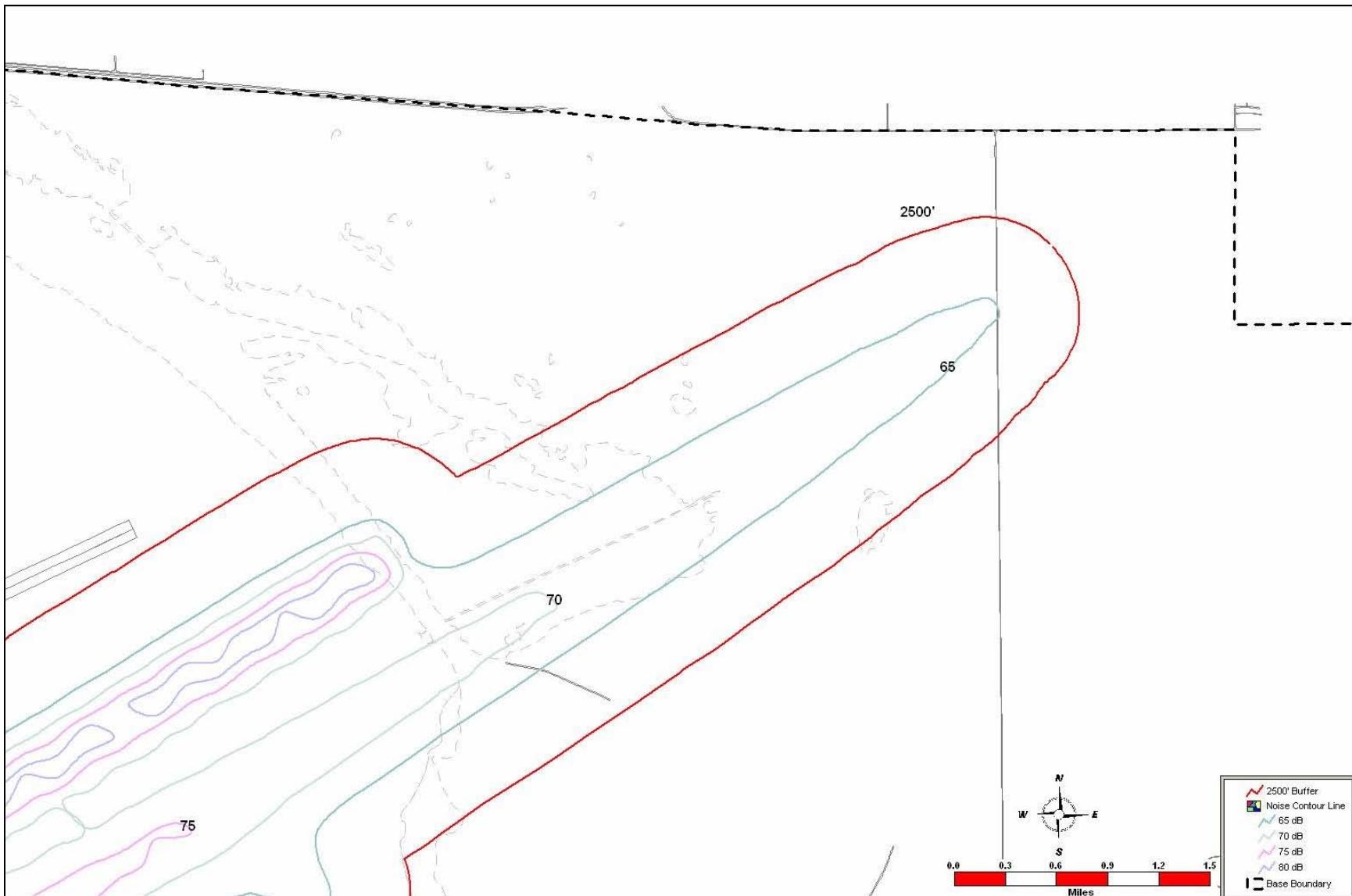


Figure 15 Noise Contour Adjustment Near Base Boundary

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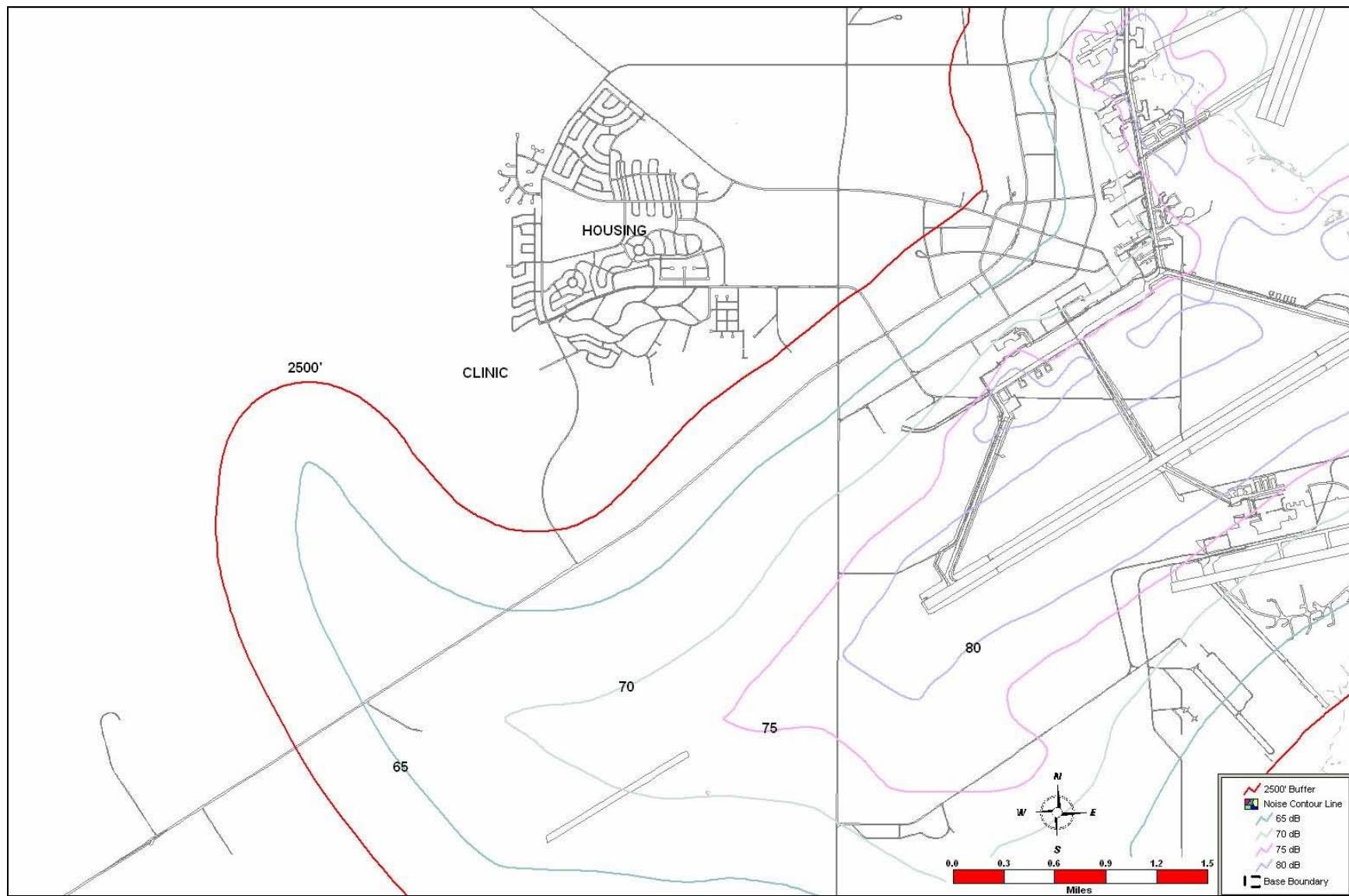


Figure 16 Noise Contour Adjustment Near Noise Sensitive Receptors

4.1.1.7 Short-Term Use Versus Long-Term Productivity

Project activities would result in a possible short-term effect on runway utilization during the demolition and reconstruction of Runway 04/22. Through proper scheduling and seasonal timelines, this effect can be avoided. The construction of a new runway and demolition/reconstruction of Runway 04/22 would have a beneficial long-term effect on the Base runway system.

4.1.2 Alternative A Minimization Measures (Preferred Alternative)

The following minimization measures are required if Alternative A is chosen.

- a. The proposed project shall obtain final siting approval from the Base Planning and Zoning Committee. Contact the Base Comprehensive Planning Branch for more information on the planning process.
- b. The proposed project shall comply with AFI 32-1026, *Planning and Design of Airfields*, and AFJMAN 32-1013(I), *Airfield and Heliport Planning and Design*.
- c. The proposed action shall comply with all regulations and instructions regarding airfield operations including, but not limited to, AFFTCI 11-2, *Ground Operations*. Contact Airfield Management for more information regarding these regulations and instructions.
- d. All project personnel shall use standard operating procedures for the prevention of FOD as identified in AFI 21-101, *Aerospace Equipment Maintenance Management*. In addition, AFJMAN 24-306, *Manual for the Wheeled Vehicle Driver*, and AFFTCI 10-2, *Control of Vehicles on the Airfield*, shall be followed.
- e. New construction, renovation, or demolition activities on the flightline have the potential to leave objects on taxiways or runways that could cause damage to aircraft and interrupt flightline operations. The proponent/contractor shall contact Airfield Management for FOD reduction guidelines.
- f. To avoid mission-related conflicts, new construction, renovation, or demolition activities on the flightline require 10 to 14 days advance notice with Airfield Management for any activity within flightline boundaries. The proponent/contractor shall contact Airfield Management for coordination requirements.
- g. Soils surrounding Runway 04/22 may need to be stabilized in order to prevent FOD during operations. Contact Airfield Management for recommendations on preferred methods of soil stabilization.

4.1.3 Alternative B Impacts

Under this alternative, construction activities would occur approximately 2,500 feet north of the centerline of Runway 04/22. Once the new 15,000-foot runway is operational, Runway 04/22 would continue to be used and repaired on an as-needed basis until complete failure. Upon complete failure, Runway 04/22 would be decommissioned in place. It is anticipated that although the noise contour lines would widen and lengthen somewhat to encompass both the new and existing runway location, thereby potentially adjusting many of the contour lines, the overall 65 Ldn contour line would continue to be contained entirely within the Edwards AFB boundary. Once Runway 04/22 is decommissioned, these contour lines would again tighten up somewhat, accounting for usage of a single runway. Therefore, no adverse impacts to AICUZ are anticipated.

The potential for FOD generation under this alternative would be less than anticipated for Alternative A because Runway 04/22 would not be demolished and reconstructed under Alternative B. No adverse impacts are anticipated to land use designation or noise. Also, no adverse impacts to airfield operations are anticipated since operations would continue on Runway 04/22 during construction of the new runway and both runways would operate until failure of Runway 04/22 occurs.

4.1.4 Alternative B Minimization Measures

The minimization measures would be the same as those described for Alternative A.

4.1.5 Alternative C Impacts

No construction and/or demolition/reconstruction activities would occur under this alternative. Therefore, Runway 04/22 would continue to degrade and FOD-related emergencies would continue to increase. Repairs would continue to be conducted as necessary. Complete failure of the runway is anticipated to occur in FY08.

Runway 04/22 is deteriorating, creating an increased chance of FOD. The PCI numbers for portions of Runway 04/22 have declined rapidly over the past few years. The cause of the rapid degradation of the concrete has been identified as ASR.

Land use designation, noise contour lines for AICUZ, airfield operations, and noise impacts would remain unchanged until complete failure of Runway 04/22 occurs, at which time airfield operations would be adversely impacted, noise would be positively impacted, and AICUZ would cease to have meaning.

4.1.6 Alternative C Minimization Measures

Under the No Action Alternative, Runway 04/22 would continue, even with routine maintenance and repair activities, to degrade to complete failure. There are no minimization/minimization measures that would slow this degradation process.

4.2 Air Quality

4.2.1 Assessment Methodology

4.2.1.1 Emissions Calculations for Construction and Demolition/Reconstruction Activities

Project-related construction activities with the potential to contribute to air quality effects include the combustion of fossil fuels in equipment and vehicles used in construction and fugitive dust from construction activities. To estimate emissions for construction of the proposed projects, lists of the types of construction equipment and estimates of the length of time the equipment would need to operate were developed based on experience with construction of similar facilities at other locations (Gowder 2004). Emission sources were assumed to be uncontrolled, unless otherwise noted. Criteria pollutant emissions associated with the following types of construction activities were estimated:

- a. On-road vehicle exhaust from trucks and cars delivering or hauling construction materials, demolition debris, or employees;
- b. Off-road equipment exhaust from operation of construction and other off-road equipment;
- c. Asphalt off-gassing;
- d. Fugitive dust associated with grading;
- e. Fugitive dust associated with vehicle travel on paved and unpaved roads;
- f. Fugitive dust associated with truck dumping and material handling; and
- g. Fugitive dust associated with disturbance of exposed graded surfaces.

Emission factors from a number of references were used to estimate exhaust emissions and fugitive dust associated with operation of the construction equipment. These references included the CARB *URBEMIS 2002* model (Version 7.4.2; Jones & Stokes Associated 2003), the South Coast Air Quality Management District (SCAQMD) *California Environmental Quality Act Air Quality Handbook* (SCAQMD 1993), the El Dorado Air Pollution Control District (EDAPCD) CEQA Guide (EDAPCD 2002), and the Sacramento Metropolitan Air Quality Management District (SMAQMD) *Roadway Construction Emissions Model, Revised Version 5.1* (SMAQMD 2004).

Construction equipment usage was estimated based on a schedule of construction tasks for each type of construction activity. Specific construction information used to estimate average daily (pound/day) and annual construction emissions (ton/year) included:

- a. Fuel type and the number and type of construction equipment to be used;
- b. Equipment usage rates (hours per day, days per construction activity);
- c. Number of construction workers onsite during a typical peak construction day;
- d. Maximum acreage under construction or disturbed on a typical peak day; and
- e. Vehicle miles traveled (VMT) by dump trucks, tractor trailers, water trucks, and construction workers.

In addition, fugitive dust sources were evaluated, including grading and excavation, entrained dust from travel on paved and unpaved roads, demolition, and other types of soil disturbance. Fugitive dust emission estimates were based on emission factors for uncontrolled conditions. Sources on Base would be mitigated through continuous application of water for dust control.

Detailed construction emission calculations and assumptions are included in Appendix A.

4.2.1.2 Emission Calculations for Operation of Asphalt and Batch Plants

The construction contractor would permit and operate two different types of batch plants to complete the runway project. Emission estimates for the drum mix asphalt plant were made using information obtained from *Compilation of Air Pollutant Emission Factors, AP-42, Fifth Edition, Volume I: Stationary Point and Area Sources*, Section 11.1, Hot Mix Asphalt Plants (U.S. EPA 2004). This reference provided emission rates for criteria pollutants in units of pounds

per ton of material processed. It was assumed that fabric filters would be used to control PM10 emissions from sources that vent to the atmosphere. Emissions attributed to the “off-gassing” of the asphalt were also estimated.

Emission factors for PM10 for the operation of the central mix drum concrete batch plant were also obtained from AP-42, Section 11.12, Concrete Batching (U.S. EPA 2001). Emission factors were provided in units of pounds per ton of concrete processed. The emission calculations assumed that standard PM emission controls would be used during cement unloading, supplemental cement activities, and mixer loading. The PM emissions attributed to the transfer of sand and aggregate into the weigh hopper were assumed to be uncontrolled.

Batch plant emissions were estimated in terms of pound/day and ton/year.

4.2.2 Alternative A Impacts (Preferred Alternative)

The preferred alternative or proposed project would occur in two construction phases. No change in future aircraft or other Base operations is expected under this alternative.

Construction Phase 1 would involve constructing a new asphalt runway that would be used by aircraft while the existing Runway 04/22 surface is demolished and rebuilt. Phase 1 activities would consist of site grading, delivery of underlay materials, compaction, and paving. Runway lighting systems would also be installed. Phase 1 is programmed to occur in FY06 and is estimated to take approximately 4 months. The new asphalt runway would be approximately 12,000 feet long and 200 feet wide in size and would include overrun areas, for a total area roughly equivalent to 64.3 acres.

Construction Phases 2 and 3 would involve demolition of the existing concrete runway surface and resurfacing. One-half of Runway 04/22 would be reconstructed at a time during Phases 2 and 3. Activities would consist of demolition, removal of demolition waste. Delivery and grading of underlay materials, compaction, and pouring a new concrete surface. Phase 2 is programmed to occur in FY07 and is estimated to take approximately 7 months. Phase 3 is programmed to occur in FY08 and would also take approximately 7 months. The existing runway is approximately 15,000 feet long by 300 feet wide in size, which is equivalent to 103.3 acres. Each half of the existing runway project (Phase 2 and 3) involves replacing approximately 51.6 acres at a time.

4.2.2.1 Criteria Pollutants

Temporary degradation in air quality may be experienced during the second and third years of the runway construction and demolition/reconstruction activities. Construction activities for the proposed project would result in emissions of criteria pollutants, including nonattainment pollutants and precursors (NO_x, VOCs, and PM10).

Table 12 presents the estimated total emissions in ton/year for the second and third years (proposed FY07 and 08) of construction. These years would represent the highest level of construction activities and emissions, representing the “peak construction year.” Emissions are

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TABLE 12
**TOTAL EMISSIONS DURING DEMOLITION AND RECONSTRUCTION ACTIVITIES IN THE
ESTIMATED PEAK CONSTRUCTION YEARS (FY07 AND O8)**

Emission Sources (1 Year)	CO	NO _x	VOC	SO _x	PM
	ton/year	ton/year	ton/year	ton/year	ton/year
On-road truck and vehicle exhaust	18.4	37.8	2.7	0.1	0.9
Off-road equipment exhaust	30.9	28.2	4.0	0.0	1.2
Fugitive dust from grading	N/A	N/A	N/A	N/A	0.6
Fugitive dust from road travel	N/A	N/A	N/A	N/A	47.9
Fugitive dust from material handling	N/A	N/A	N/A	N/A	1.1
Fugitive dust from disturbed areas	N/A	N/A	N/A	N/A	.7
Total Emissions	49.3	66.0	6.7	0.1	52.4

Notes: 1. Emissions are estimated to be the same for both years (FY07 and 08).

2. FY - fiscal year
3. CO – carbon monoxide
4. NO_x – oxides of nitrogen
5. VOC – volatile organic compound
6. SO_x – sulfur oxide
7. PM – particulate matter
8. N/A – not applicable

estimated to be the same for both years. The significance of these emissions is discussed under Section 4.2.2.3, General Conformity.

The proposed project would involve the operation and permitting of batch plants. It may also involve the use of stationary construction equipment (e.g., generators, air compressors, and welders) over 50 bhp. If such equipment remains on Base for more than 45 days, it would also require air quality permits from KCAPCD. Stationary construction equipment exceeding 50 bhp that remains on Base less than 45 days and emits less than 20 tons per year (tpy) of any air contaminant must have a written exemption from the Kern County Air Pollution Control Officer to operate.

Two different types of batch plants are anticipated to be required to complete the runway project. The emissions from the two types of plants have been estimated. Daily emissions were calculated using estimates of maximum daily output of asphalt or concrete, because this would be the basis for local air quality permits. Annual emission were calculated using the assumptions regarding plant output and total material requirements provided by Mr. John W. Stephens, Edwards AFB, (95 ABW/CEC) (Stephens 2004).

The new asphalt runway (Construction Phase 1) would use an onsite drum mix asphalt batch plant that would have an average output of 4,000 tons/day of material and a maximum of 8,000 tons/day. It was assumed that the plant would produce approximately 102,000 tons of material to complete paving of the new 12,000-foot-long, 200-foot-wide runway (Stephens 2004).

Reconstruction of Runway 04/22 during Construction Phases 2 and 3 would require a central mix drum concrete batch plant operations to be established onsite. It was assumed that the

plant/operations area would have an average output of 6,000 tons/day, a maximum output of 12,000 tons/day, and that 500,000 tons of concrete would be required to complete the project over 2 years. Therefore, the plant/operations area would produce approximately 250,000 tons of concrete each year (Stephens 2004). Table 13 presents the annual emission estimates for operation of the proposed batch plants.

**TABLE 13
ESTIMATED TOTAL ANNUAL EMISSIONS DURING BATCH PLANT OPERATIONS**

Emission Source	CO	NO_x	VOC	SO_x	PM10
	ton/year	ton/year	ton/year	ton/year	ton/year
Drum mix asphalt batch plant	6.6	1.3	1.6	0.2	1.2
Central mix drum batch plant	N/A	N/A	N/A	N/A	2.0
Total Batch Plant Operations	6.6	1.3	1.6	0.2	3.2

Notes: 1. Emissions are estimated to be the same for both years (FY07 and 08).

2. CO – carbon monoxide
3. NO_x – oxides of nitrogen
4. VOC – volatile organic compound
5. SO_x – sulfur oxide
6. PM10 – particulate matter less than or equal to 10 microns
7. N/A - not applicable

Contractors would be required to permit the asphalt and concrete batch plants under the KCAPCD NSR rules, and would be required to operate the plants in compliance with all applicable rules and regulations. No significant impacts are anticipated to occur as a result of operation of permitted batch plants.

4.2.2.2 Toxic Air Contaminants and Hazardous Air Pollutants

For the proposed project, the primary concern from project activities would be human exposure to particulate exhaust from diesel-fueled engines, because diesel PM10 is a TAC considered by the State of California to be a carcinogen. Other TAC or HAP emissions generated by the construction/demolition activities may include VOCs or inorganic elements (metals) from fuel handling and combustion. These emissions would be at low rates and short-term duration, occurring over approximately 17 months in a 3-year period.

Under the proposed project, construction activities and vehicle travel are anticipated to occur either on Edwards AFB or on roads in largely rural areas, distant from residential or occupational receptors. Construction and other employees are protected from chronic and acute exposures to TACs and HAPs under Federal and State occupational safety and health regulations and requirements. In addition, California has embarked on an aggressive program to reduce emissions of diesel PM10 from all stationary, mobile, and nonroad diesel emission sources with Airborne Toxics Control Measures to be issued and implemented in the next decade.

Continuous lifetime exposure of receptors to TAC emissions resulting in a finding of significant impact is not anticipated to occur as a result of implementation of the proposed project.

4.2.2.3 General Conformity

Estimated annual emissions for unmitigated construction of the proposed project in areas not attaining the NAAQS have been summed and compared to the applicable *de minimis* thresholds and regional emission inventories.

As indicated previously, the proposed project is located within the eastern Kern County portion of Edwards AFB. This area attains or is unclassified for all NAAQS, except for the 1- and 8-hour ozone NAAQS for which the area is classified attainment/maintenance and *basic* nonattainment, respectively. In this area, the ozone precursor emissions, NO_x and VOC, are subject to general conformity requirements. In accordance with the air conformity requirements of 40 CFR 51.853/93.153(b)(1) and KCAPCD Rule 210.7, the *de minimis* level set for O₃ attainment/maintenance areas is up to 100 tons per O₃ precursor pollutant NO_x and VOC per year per Federal action. The same *de minimis* level has been assumed for the basic nonattainment area.⁹

A conformity determination IAW 40 CFR 93.153(c)(1) is not required as the total direct and indirect emissions from the preferred alternative are below the *de minimis* thresholds specified in 40 CFR 93.153(b)(1) and are not regionally significant. The estimated total air emissions for construction of the proposed project are presented in Table 14. In the first scenario evaluated, all emissions are assumed to occur in KCAPCD, and are therefore compared to the applicable KCAPCD *de minimis* levels. The emission values represent total annual emissions from all on- and off-road travel of construction equipment and personal vehicles and construction activities that would occur during the peak construction years. As presented in Table 14, total emissions do not exceed the applicable KCAPCD *de minimis* levels for NO_x or VOCs.

In addition, to allow for analysis of potential emissions that might occur due to travel of project-related construction delivery and haul trucks in the AVAQMD nonattainment area, a second scenario has been evaluated. In this second scenario, a conservative assumption has been made that up to on-half of the on-road travel associated with the proposed project would occur outside Kern County, in the Antelope Valley, which is located in northern Los Angeles County. The estimated emissions that might occur in AVAQMD for this scenario are also presented in Table 14 and are compared to the applicable AVAQMD *de minimis* levels. Again, estimated emissions do not exceed the applicable *de minimis* levels for NO_x and VOCs.

The relevant and applicable *de minimis* levels for criteria pollutant emissions in KCAPCD and AVAQMD are already less than the corresponding 10-percent threshold values. The proposed action would result in emissions that are below the applicable *de minimis* levels. Thus, the proposed project would not have a regionally significant impact in the KCAPCD or AVAQMD.

⁹ U.S. EPA has not yet ruled on *de minimis* levels for basic nonattainment areas, but it can be assumed that the same levels would be allowed for basic nonattainment areas as are currently allowed for moderate nonattainment areas. Basic nonattainment areas have less severe air quality issues than moderate nonattainment areas and earlier attainment target dates.

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TABLE 14
ESTIMATED TOTAL EMISSIONS DURING CONSTRUCTION AND
DEMOLITION/RECONSTRUCTION ACTIVITIES,
WITH COMPARISON TO APPLICABLE THRESHOLDS

Construction Scenarios and Applicable <i>de minimis</i> Thresholds	CO	NO _x	VOC	SO _x	PM
	ton/year	ton/year	ton/year	ton/year	ton/year
Scenario 1 – All emissions in KCAPCD. Estimated peak construction year total emissions during construction and demolition/reconstruction activities.	49.3	66.0	6.7	0.1	52.4
KCAPCD <i>de minimis</i> level	N/A	100	100	N/A	N/A
Exceed applicable <i>de minimis</i> level (Yes or No)	N/A	NO	NO	N/A	N/A
Scenario 2 – Some emissions in AVAQMD. Emissions that might occur assuming one-half of on-road travel occurs in AVAQMD.	9.2	18.9	1.3	0.0	0.5
AVAQMD <i>de minimis</i> level	N/A	25	25	N/A	N/A
Exceed applicable <i>de minimis</i> level (Yes or No)	N/A	50	50	N/A	N/A

- Note:
1. CO – carbon monoxide
 2. NO_x – oxides of nitrogen
 3. VOC – volatile organic compound
 4. SO_x – sulfur oxides
 5. PM – particulate matter
 6. KCAPCD - Kern County Air Pollution Control District
 7. N/A – Not Applicable
 8. AVAQMD - Antelope Valley Air quality Management District

None of the applicable *de minimis* levels would be exceeded nor would the predicted total emissions be regionally significant. As indicated previously, a Federal action or “project” is exempt from the general conformity rule (presumed or conform) if the project-related emissions are not regionally significant and are less than the *de minimis* threshold levels established by the conformity rule. No significant impact related to general conformity is anticipated to occur.

Emissions calculations for operation of the proposed batch plants have also been completed, as previously presented. However, the asphalt and concrete batch plants would be permitted and operated by contractors under the KCAPCD NSR rule. Compliance with the approved KCAPCD NSR program is presumed to represent compliance with the applicable SIP, as these rules and regulations are part of the approved SIP. Therefore, permitted emission sources are not subject to general conformity applicability analysis.

A copy of the air conformity letter can be found in Appendix A. The proposed project would comply with all applicable Federal, State, and local laws and regulations. Compliance with the

minimization measures listed in Section 4.2.3 would further reduce anticipated impacts due to criteria pollutant, TAC, or ozone precursor pollutant air emissions. Therefore, no long-term adverse impacts to air quality are anticipated.

4.2.2.4 Direct/Indirect Effects

The use of construction equipment and vehicular traffic from construction activities would directly affect air emission levels. However, based on air emission calculations, emission levels would be at *de minimis* levels. The indirect effect to regional air quality values would be insignificant.

4.2.2.5 Short-Term Use Versus Long-Term Productivity

Air quality levels would be impacted by the use of construction equipment and would be short-term and insignificant based upon air emission calculations. The emission levels would be within *de minimis* levels and, therefore, the long-term effects to regional and local air quality would be insignificant.

4.2.3 Alternative A Minimization Measures (Preferred Alternative)

The following minimization measures are required or recommended if Alternative A is chosen.

- a. The project shall comply with all applicable KCAPCD rules and regulations.
- b. Any stationary sources associated with the proposed project shall comply with all *Air Toxics “Hot Spots” Information and Assessment Act* requirements, including revision of existing emission inventory plans and/or health risk assessments.
- c. The proposed project shall comply with all applicable rules and regulations as identified in AFI 32-7040, *Air Quality Compliance*.
- d. The contractor shall be required to obtain air quality permits (an ATC or PTO) from the KCAPCD for the construction and operation of the asphalt and concrete batch plants.
- e. The contractor shall be required to obtain air quality permits for ICEs over 50 bhp rating (e.g., welders, generators, and compressors) operated on Edwards AFB for more than 45 calendar days. If such equipment is to remain on Base less than 45 calendar days, then a written exemption shall be obtained from the local air agency.
- f. The proposed project shall comply with all CAA Title III HAP requirements, or any more stringent State or local requirements, as they apply to stationary sources that emit TACs or HAPs.
- g. Project proponent/contractor shall report all chemicals/materials they procure for this project by any means other than the Hazmat Pharmacy to EM in order for these chemicals/materials to be included in the Base's emission reports and for the Base to meet their hazardous material inventory requirements.
- h. The proposed project shall comply with all BACT specified in KCAPCD Rule 210.1, *New and Modified Stationary Source Review (NSR)*.

- i. All vehicles transporting clean fill material or construction debris require a cover to reduce PM10 emissions during transport.
- j. All earthwork activities shall be planned and conducted to minimize the duration that soils would be left unprotected. The extent of the area of disturbance necessary to accomplish the project shall be minimized. Exposed surfaces should be periodically sprayed with water.
- k. Ground-disturbing activities shall be delayed during high-wind conditions (over 25 mph).
- l. All mechanical equipment shall be kept in working order according to applicable technical orders and equipment maintenance manuals to reduce emissions to acceptable levels.
- m. All construction equipment and vehicles shall comply with applicable emission standards for 1996 or newer engines.

4.2.4 Alternative B Impacts

In the air quality analysis for this environmental assessment, emissions were quantified only for Alternative A, the Preferred Alternative. The applicable air quality significance criteria for this project are the general conformity *de minimis* levels, and as indicated previously, a conformity determination is only required for the alternative that is ultimately selected and approved. Emissions and air quality impacts for Alternative B have been evaluated on a qualitative basis.

Emissions for Alternative B would be substantially lower than those estimated for Alternative A. No asphalt batch plant is proposed, so these emissions would not occur. The asphalt runway would not be constructed, so the emissions associated with this construction would not occur. Because the existing runway would be abandoned in place, the emissions from demolition and on road truck trips associated with debris removal would not occur.

No significant air quality impacts were identified in the detailed analysis conducted for Alternative A. For this reason, and because emissions from Alternative B would be lower than those for Alternative A, no significant air quality impacts would be expected under Alternative B.

4.2.5 Alternative B Minimization Measures

The minimization measures would be the same as those described for Alternative A.

4.2.6 Alternative C Impacts

Under this alternative, construction and/or demolition/reconstruction activities would not occur. Therefore, Runway 04/22 would continue to degrade and FOD-related emergencies would continue to increase. Repairs would continue to be conducted as necessary. There would be no change in current air quality emissions with this alternative.

4.2.7 Alternative C Minimization Measures

No new minimization measures are required or recommended beyond those currently being implemented.

4.3 Water Resources

4.3.1 Alternative A Impacts (Preferred Alternative)

4.3.1.1 Stormwater Management

The proposed project would involve the construction of a new runway and demolition/reconstruction of Runway 04/22. These activities could potentially affect the stormwater runoff drainage patterns. As of December 2001, ground-disturbing activities on Edwards AFB no longer require coverage under the Stormwater General Permit associated with construction activities because it was determined by the Supreme Court that Section 404 of the CWA did not extend to isolated wetlands if they are not “adjacent” to navigable waters (Solid Waste Agency of Northern Cook County vs. United States Army Corps of Engineers 2001). Therefore, construction activities need not submit a Notice of Intent with the RWQCB. However, it is recommended that construction projects develop a site-specific SWPPP and implement the BMPs within the Plan. Therefore, no adverse impacts to water resources are anticipated.

4.3.1.2 Direct/Indirect Effects

Construction of a new runway and demolition/reconstruction of Runway 04/22 has the potential to directly affect surface runoff and water quality. However, by implementing a stormwater pollution prevention plan as part of the construction plan, the effects of runoff would be minimized. These control measures would indirectly affect water quality and quantity of the shallow groundwater by preventing excess contaminated soil from entering the stormwater drainage system.

4.3.1.3 Short-Term Use Versus Long-Term Productivity

Construction of a new runway and demolition/reconstruction of Runway 04/22 would have a short-term effect on the normal surface drainage patterns in the area. Implementation of a stormwater pollution prevention plan would minimize any adverse effects due to stormwater runoff. Instituting control measures would also have a long-term effect by minimizing the potential for flooding due to excess surface runoff.

4.3.2 Alternative A Minimization Measures (Preferred Alternative)

The following minimization measure is recommended if Alternative A is chosen.

- a. The proponent/contractor should develop a site-specific SWPPP and follow the BMPs within this Plan in order to meet the requirements of the CWA. The site-specific SWPPP shall be submitted to 95 ABW/EMC (EM Compliance) for review prior to construction activities.

4.3.3 Alternative B Impacts

Under this alternative, a new runway would be approximately 3,000 feet longer and 100 feet wider than that proposed for Alternative A. Therefore, impacts to water resources under this alternative would be somewhat greater than those anticipated for Alternative A.

4.3.4 Alternative B Minimization Measures

The minimization measure would be the same as described for Alternative A.

4.3.5 Alternative C Impacts

Under this alternative, runway construction and/or demolition/reconstruction activities would not occur. Therefore, no additional impacts to water resources are anticipated.

4.3.6 Alternative C Minimization Measures

No new minimization measures are required or recommended beyond those currently being implemented.

4.4 Safety and Occupational Health

4.4.1 Alternative A Impacts (Preferred Alternative)

4.4.1.1 Exposure Hazards

Elements of the existing environment can pose short-term health and safety issues for personnel during proposed project activities. Specifically, project personnel could be exposed to hazardous noise and heavy metal-based paints during runway construction and demolition/reconstruction activities. Project activities would occur adjacent to the Main Base flightline and within ERP Site 71, Old South Base Facilities and Fuel Depot; ERP Site 88, Old South Base Underground Storage Tanks 28 to 43 and 92; and ERP Site 302, CalNev JP-4 Fuel Pipeline (see Figure 3). Compliance with the measures listed in Section 4.4.2 would minimize health and safety hazards to personnel. Therefore, no adverse impacts to safety and occupational health are anticipated.

4.4.1.2 Direct/Indirect Effects

Construction of a new runway and the demolition/reconstruction of Runway 04/22 would have the direct effect of exposing construction workers to lead-based paint and contaminated soil areas. Implementing administrative controls and using appropriate protective measures would minimize the potential risk to human health. Construction of a new runway and the demolition/reconstruction of Runway 04/22 would have a beneficial indirect effect by providing a safe and reliable takeoff and landing strip and reducing the potential for FOD hazards to aircraft and their pilots.

4.4.1.3 Short-Term Use Versus Long-Term Productivity

The potential for exposure to hazardous materials during construction and/or demolition/reconstruction activities would be short-term until project activities are complete. The removal of lead-based paint through the reconstruction of Runway 04/22 would result in a beneficial long-term effect by removing this potential exposure hazard to maintenance personnel.

4.4.2 Alternative A Minimization Measures (Preferred Alternative)

The following minimization measures are required if Alternative A is chosen.

- a. The proposed project shall comply with the standards, instructions, and regulations listed in Section 3.4.1 applicable to the proposed project.
- b. The contractor shall be registered with Cal-OSHA prior to implementing lead-based paint activities and must fully understand and adhere to the contents of the following:
 - 1) Title 8 CCR, Section 1532.1, *Lead*.
 - 2) Title 8 CCR, Section 3203, Injury and Illness Prevention Program.
 - 3) Title 29 CFR 1910.1025, *Lead*.
 - 4) Title 29 CFR 1926.62, *Lead*.
 - 5) Title 40 CFR Part 61, National Emission Standards for Hazardous Air Pollutants.
- c. Any lead-based paint that has the potential to be disturbed as a result of implementing the proposed project must first be abated by qualified and trained lead-based paint workers as defined in 8 CCR 1532.1 and 29 CFR 1926.62.
- d. The proponent/contractor shall contact the Civil Engineer Group Environmental Coordinator for the Edwards AFB adapted Army Corps of Engineers Guide Specifications for Military Construction, Section 02090, entitled, *Removal and Disposal of Lead-Containing Paint and Coatings*. The adapted specification would be applicable to all lead-based paint-related work at Edwards AFB.
- e. The contractor shall submit an Abatement and Disposal Plan for coordination to the Civil Engineer Group Environmental Coordinator and Bioenvironmental Engineering prior to abatement activities. Coordination by the contractor is required to ensure proper engineering controls are in place for abatement and disposal activities. This would include the appropriate lead-based paint testing requirements for waste characterization.
- f. Trenching and digging below the ground surface in an ERP site may result in encountering contaminated soil above a preliminary remediation goal (PRG) and may require a site-specific HASP, which the contractor shall prepare prior to starting any excavations. During excavation activities where soil and/or groundwater in the area may be contaminated, workers may be exposed, through inhalation, to contaminated dust or VOCs. Contact 95th Aerospace Medical Squadron/Bioenvironmental Engineering (95 AMDS/SGPB) regarding HASP concerns.
- g. All personnel present within hazardous noise areas as stated in AFOSH Standard 48-19, *Hazardous Noise Program*, shall follow the applicable hearing protection guidelines.

4.4.3 Alternative B Impacts

Under this alternative, project activities would occur in ERP Site 302 during the rerouting of utility lines along Lancaster Boulevard (see Figure 4). As Runway 04/22 would not be demolished and reconstructed under this alternative, project activities would not occur within ERP Sites 71 and

88. Also, the potential for exposure to lead-based paint would not exist, as Runway 04/22 would not be demolished under this alternative. Therefore, the impacts to safety and occupational health under this alternative would be less than those anticipated for Alternative A.

4.4.4 Alternative B Minimization Measures

The following minimization measures are required if Alternative B is chosen.

- a. The proposed project shall comply with the standards, instructions, and regulations listed in Section 3.4.1 applicable to the proposed project.
- b. Trenching and digging below the ground surface in an ERP site may result in encountering contaminated soil above a PRG and may require a site-specific HASP, which the contractor shall prepare prior to starting any excavations. During excavation activities where soil and/or groundwater in the area may be contaminated, workers may be exposed through inhalation to contaminated dust or VOCs. Contact 95 AMDS/SGPB regarding HASP concerns.
- c. All personnel present within hazardous noise areas as stated in AFOSH Standard 48-19, *Hazardous Noise Program*, shall follow the applicable hearing protection guidelines.

4.4.5 Alternative C Impacts

Under this alternative, construction and/or demolition/reconstruction activities would not occur. Therefore, Runway 04/22 would continue to degrade and FOD-related emergencies would continue to increase. Repairs would continue to be conducted as necessary. Complete failure of the runway is anticipated to occur in FY08. Therefore, no additional impacts to safety and occupational health are anticipated.

4.4.6 Alternative C Minimization Measures

No new minimization measures are required or recommended beyond those currently being implemented.

4.5 Hazardous Materials and Waste

4.5.1 Alternative A Impacts (Preferred Alternative)

4.5.1.1 Hazardous Materials

The types and quantities of hazardous materials used during the construction of a new runway and demolition/reconstruction of Runway 04/22 would not be different from those already used on Base. Compliance with all applicable standards and/or regulations addressing hazardous materials management is required, and would ensure proper handling, use, and storage of these substances on Base. Therefore, no adverse impact is anticipated as a result of hazardous materials.

4.5.1.2 Hazardous Waste

The types and quantities of hazardous wastes generated during the construction of a new runway and demolition/reconstruction of Runway 04/22 would not be different from those already generated on Base. Compliance with all applicable standards and/or regulations addressing hazardous waste management is required, and would ensure proper handling, storage, and disposal of hazardous wastes generated on Base. Standard operating procedures identified in the Edwards AFB HWMP governing the control of hazardous waste would prevent the creation of new contamination sites. Therefore, no adverse impact is anticipated as a result of hazardous waste.

Heavy metal-based paints (including lead, chromium, and mercury) may be encountered in the runway markings during Runway 04/22 demolition activities. Heavy metal-based paints are considered a hazardous waste and must be disposed of properly.

4.5.1.3 Solid Waste

This alternative would produce approximately 200,000 tons of CDW through Runway 04/22 construction and demolition/reconstruction activities. This volume of solid waste would require disposal at an approved State-licensed landfill, as stipulated by contractual agreement.

Some waste generated from the proposed action could be recycled (e.g., concrete, asphalt, paving, metals). Reuse or recycling of appropriate materials would reduce the amount of solid waste disposed of at landfills (either on or off Base), resulting in an incrementally positive impact to solid waste management. It could also provide alternate sources for required building materials, potentially reducing future impacts on nonrenewable natural resources. An additional option being considered is using the crushed concrete as fill material or cover for inactive landfills.

Edwards AFB is in the process of establishing a processing center for construction, demolition, and inert debris. If this location is approved and inert debris processing is authorized at this location, Civil Engineering would specify the area at the processing center where the material could be stockpiled. Since the material from Runway 04/22 has been identified as having ASR, the material would be segregated from other inert debris at this location. If this location is not approved at the time of project activities, CDW disposal would then be required at an approved off-Base State-licensed landfill. Therefore, no adverse impact is anticipated as a result of solid waste.

4.5.1.4 Direct/Indirect Effects

Construction of a new runway and demolition/reconstruction of Runway 04/22 would have a direct effect on the use of hazardous materials and the generation of hazardous waste. The use of hazardous materials such as paints and solvents during construction and demolition/reconstruction activities would be no different than those already used on Base. The generation of wastes from lead-based paint removal would also be a direct effect from Runway 04/22 demolition activities. Solid waste would be generated through the demolition/reconstruction of Runway 04/22. Each of the actions would be conducted IAW environmental practices and regulations. By following regulatory practices, the indirect effect would be the minimizations of risk to human health.

4.5.1.5 Short-Term Use Versus Long-Term Productivity

During construction and the demolition/reconstruction activities, the use of hazardous material and generation of hazardous waste, including solid waste, would be a short-term effect in the project area. Segregating recyclable and recoverable materials from solid waste and transporting solid waste to a State-licensed off-Base facility would be a beneficial long-term effect to the Base wastestream.

4.5.2 Alternative A Minimization Measures (Preferred Alternative)

The following minimization measures are required or recommended if Alternative A is chosen.

- a. In accordance with 29 CFR 1910.1200 on hazard communication, all hazardous materials would be documented with required MSDSs as part of a complete hazardous materials inventory. A copy of the inventory and all pertinent MSDSs shall be submitted to Bioenvironmental Engineering in support of the Base Hazardous Materials Program and *Air Force Hazard Communication Program* (AFOSH Standard 48-21).
- b. The MSDS for each hazardous material used at the construction site shall be present during proposed project activities.
- c. The Base Director of Safety shall be notified at least 48 hours prior to hazardous materials off-loading.
- d. Any hazardous waste generated during runway construction and demolition/reconstruction of Runway 04/22 shall be handled IAW applicable regulations: 49 CFR 171–177, *Waste Transportation and Packaging*; 40 CFR 260–299, *Storage, Treatment, and Disposal of Waste*; AFI 32-7042, *Solid and Hazardous Waste Compliance*; and the Edwards AFB HWMP (AFFTC 1999a).
- e. Hazardous wastes are subject to land disposal restriction requirements. Signed hazardous waste disposal manifests shall be required for any waste containing heavy metal-based paints prior to transportation for off-Base disposal to a U.S. EPA-approved landfill.
- f. The proponent/contractor shall submit heavy metal-based paints and all hazardous waste manifests to 95 ABW/EMCC (EM Compliance).
- g. The contractor shall not sweep removed lead-based paint from the paved surfaces, and the area should be kept wet during paint removal.
- h. This project would generate CDW. The proponent/contractor shall be responsible for transporting solid waste to a State-licensed facility.
- i. The contractor should segregate recyclable and reusable materials from solid waste for delivery to the appropriate on- and off-Base recovery or disposal facilities. The 95th Civil Engineer Squadron, Group Environmental Office, should be contacted regarding recyclable debris.

4.5.3 Alternative B Impacts

Under this alternative, a new runway would be constructed and Runway 04/22 would not be demolished and reconstructed. Therefore, impacts to hazardous and solid waste under this

alternative would be significantly less than those anticipated for Alternative A. Impacts for hazardous materials would be the same as those anticipated for Alternative A because similar material would be used for construction activities.

4.5.4 Alternative B Minimization Measures

The following minimization measures are required or recommended if Alternative B is chosen.

- a. In accordance with 29 CFR 1910.1200 on hazard communication, all hazardous materials shall be documented with required MSDSs as part of a complete hazardous materials inventory. A copy of the inventory and all pertinent MSDSs shall be submitted to Bioenvironmental Engineering in support of the Base Hazardous Materials Program and *Air Force Hazard Communication Program* (AFOSH Standard 48-21).
- b. The MSDS for each hazardous material used at the construction site shall be present during proposed project activities.
- c. The Base Director of Safety shall be notified at least 48 hours prior to hazardous materials off-loading,
- d. Any hazardous waste generated during runway construction shall be handled IAW applicable regulations: 49 CFR 171–177, *Waste Transportation and Packaging*; 40 CFR 260–299, *Storage, Treatment, and Disposal of Waste*; AFI 32-7042, *Solid and Hazardous Waste Compliance*; and the Edwards AFB HWMP (AFFTC 1999a).
- e. This project would generate CDW. The proponent/contractor shall be responsible for transporting solid waste to a State-licensed facility.
- f. The contractor should segregate recyclable and reusable materials from solid waste for delivery to the appropriate on- and off-Base recovery or disposal facilities. The 95th Civil Engineer Squadron, Group Environmental Office, should be contacted regarding recyclable debris.

4.5.5 Alternative C Impacts

Under this alternative, construction and/or demolition/reconstruction activities would not occur. Therefore, Runway 04/22 would continue to degrade and FOD-related emergencies would continue to increase. Repairs would continue to be conducted as necessary. Complete failure of the runway is anticipated to occur in FY08. Therefore, no additional impacts to hazardous materials and waste are anticipated.

4.5.6 Alternative C Minimization Measures

No new minimization measures are required or recommended beyond those currently being implemented.

4.6 Biological Resources

4.6.1 Alternative A Impacts (Preferred Alternative)

4.6.1.1 Animal Species

Ground-disturbing activities may impact nesting sites of ground-dwelling birds such as the burrowing owl. Burrowing owls are known to inhabit drainage pipes and other man-made structures in the flightline area. This constitutes a short-term impact to biological resources. Therefore, no adverse impacts to animal species are anticipated.

4.6.1.2 Plant Species

Although this area is considered potential habitat for alkali Mariposa lily, no lilies were observed during prior surveys. Therefore, no adverse impacts to plant species are anticipated.

4.6.1.3 Direct/Indirect Effects

Construction of a new runway and demolition/reconstruction of Runway 04/22 would require fill material. The fill material would be hauled from existing off-Base borrow pits, the impacts of which are not addressed in this assessment. If burrowing owls and their nests are relocated from the project area, direct negative effects to individual animals may occur due to the relocation process. However, relocating the animals would also serve as an indirect beneficial effect by reducing the potential for BASH incidents near the flightline, thus reducing potential injury to individual birds and damage to aircraft.

4.6.1.4 Short-Term Use Versus Long-Term Productivity

Relocating birds or their nests from construction areas would have a short-term negative effect due to the potential for improperly handling animals during the relocation process. However, beneficial long-term effects to the bird population would result by reducing potential injury to individual birds as well as reducing the potential for BASH incidents.

4.6.2 Alternative A Minimization Measures (Preferred Alternative)

The following minimization measures are required if Alternative A is chosen.

- a. Project personnel shall use existing access roads and staging areas, and follow flagged access routes.
- b. Preactivity surveys (48 hours before construction begins) shall be conducted by authorized biologists.
- c. All trash shall be placed in raven-proof receptacles for proper disposal.
- d. If any wildlife is trapped in excavations at work sites, 95th Air Base Wing/ EM Conservation Branch (95 ABW/EMXC) shall be notified immediately. An inspection for trapped wildlife shall be made prior to backfilling. All open excavations shall have a ramp with a 3:1 slope at each end to facilitate escape of trapped wildlife. Excavations left

overnight shall be secured prior to leaving the site. Exclusionary fencing or plywood may be used to prevent wildlife from becoming trapped in excavations.

- e. Ground-disturbing activities should be planned during non-nesting periods, generally between October and February. A depredation permit is required to remove a bird or an active bird nest. A 95th Air Base Wing/Environmental Management (95 ABW/EM) representative must perform removal of birds or nests.

4.6.3 Alternative B Impacts

Under this alternative, project activities would occur in the same area as Alternative A. However, an additional 900,000 square feet of disturbance would occur under this alternative. Therefore, impacts to biological resources area disturbance would be greater than those anticipated for Alternative A.

4.6.4 Alternative B Minimization Measures

The minimization measures would be the same as those described for Alternative A.

4.6.5 Alternative C Impacts

Under this alternative, construction and/or demolition/reconstruction activities would not occur. Therefore, Runway 04/22 would continue to degrade and FOD-related emergencies would continue to increase. Repairs would continue to be conducted as necessary. Complete failure of the runway is anticipated to occur in FY08. Therefore, no additional impacts to biological resources are anticipated.

4.6.6 Alternative C Minimization Measures

No new minimization measures are required or recommended beyond those currently being implemented.

4.7 Cultural Resources

4.7.1 Alternative A Impacts (Preferred Alternative)

4.7.1.1 Prehistoric Archaeological Resources

There is one prehistoric cultural resources site (archaeological site) within the proposed project area. This site has been previously evaluated and determined eligible for the NRHP. If mitigation measures are implemented, no significant adverse impacts are anticipated.

4.7.1.2 Historic Resources

There are four historic period archaeological sites within the proposed project area. One of these sites, the township of Muroc, has been previously evaluated and determined eligible for the NRHP. If mitigation measures are implemented, no significant adverse impacts are anticipated. The other three sites have not been evaluated for NRHP eligibility.

4.7.1.3 Direct/Indirect Effects

Construction of a new runway and demolition/reconstruction of Runway 04/22 would have a negative direct effect on the township of Muroc, the three other historic period archaeological sites, and the prehistoric archaeological site. Any activities that may damage or destroy eligible or nonevaluated cultural resource sites would create a negative direct effect. Section 106 evaluation conducted at these sites to determine NRHP eligibility, and mitigation efforts on eligible sites prior to construction activities would minimize these negative direct effects. Indirect effects of the construction of a new runway and demolition/reconstruction of Runway 04/22 would occur, as evaluation of the five archaeological sites would accomplish an increase in knowledge of these sites.

4.7.1.4 Short-Term Use Versus Long-Term Productivity

The mitigation of adverse effects to cultural resources accomplished by a Section 106 evaluation prior to the construction of a new runway and demolition/reconstruction of Runway 04/22 would be a positive short-term effect. Increased knowledge regarding the prehistory and history of the area would be a long-term positive effect resulting from the evaluation of these sites.

4.7.2 Alternative A Mitigation Measures (Preferred Alternative)

The following mitigation measures are required if Alternative A is chosen.

- a. Prior to runway construction, the township of Muroc and the prehistoric site shall require a Phase III minimization/mitigation effort. This effort may include archival research, site excavation, mapping, laboratory analysis, and report preparation.
- b. The other three historic period sites shall require Phase II evaluations to determine eligibility for the NRHP. These efforts may include archival research, site excavation, mapping, laboratory analysis, and report preparation. It is expected that neither of these sites would be determined eligible for the NRHP, and no further minimization/mitigation would be required.

4.7.3 Alternative B Impacts

Under this alternative, project activities would occur in the same area as Alternative A. Although this alternative would require 3,100 feet more ground disturbance than Alternative A, the same cultural resources would be impacted. Therefore, impacts to cultural resources would be the same as those anticipated for Alternative A.

4.7.4 Alternative B Mitigation Measures

The mitigation measures would be the same as those described for Alternative A.

4.7.5 Alternative C Impacts

Under this alternative, construction and/or demolition/reconstruction activities would not occur. Therefore, Runway 04/22 would continue to degrade and FOD-related emergencies would continue to increase. Repairs would continue to be conducted as necessary. Complete failure of the

runway is anticipated to occur in FY08. Therefore, no additional impacts to cultural resources are anticipated.

4.7.6 Alternative C Mitigation Measures

No minimization/mitigation measures are required or recommended.

4.8 Geology and Soils

4.8.1 Alternative A Impacts (Preferred Alternative)

4.8.1.1 Topography

Topography is the greatest factor increasing soil erosion. For the purpose of this discussion, topographic features that increase erosion may be defined as any slope greater than 1:1. The soils of such slopes are influenced by gravity and have a greater tendency to erode than do those on flat land. In such cases, vegetation is often an important factor in keeping such soils stable.

Trenching and grading activities expose soils to wind erosion. Due to the high winds that are common to the west Mojave, exposed soils can contribute to wind erosion, PM10 emissions, and reduction in visibility due to particles in the air. If recommended minimization measures are implemented, no adverse impacts are anticipated.

4.8.1.2 Environmental Restoration Program Site Disturbance

The ERP sites and AOCs often undergo long-term monitoring and remediation efforts. These sites can be susceptible to damage from adjacent ground-disturbing activities. Numerous wells which consist of little more than short aboveground pipes may be positioned to sample groundwater at precise locations, representing hours of work. The environment of a remediation or monitoring site is sensitive to disturbance as precise measurements may require controlled conditions. The data obtained is required to accomplish ERP goals and objectives.

Numerous ERP monitoring wells are located within the proposed project area. Two remediation systems are located adjacent to Runway 04/22 and have the potential to be impacted during Runway 04/22 demolition/reconstruction activities. Project activities such as vehicle and heavy equipment operation have the potential to damage monitoring wells, lines, and/or remediation systems (see Figure 3). Environmental Restoration Program Site 302 is located adjacent to Lancaster Boulevard and there are no ERP monitoring wells, lines, and/or remediation equipment located within this area. If recommended minimization measures are implemented, no adverse impacts are anticipated.

4.8.1.3 Direct/Indirect Effects

Construction of a new runway and demolition/reconstruction of Runway 04/22 would occur adjacent to ERP monitoring wells and remediation equipment. Consultation with EM would be required prior to project activities in order to minimize the potential for damage to the ERP monitoring wells and remediation systems.

4.8.1.4 Short-Term Use Versus Long-Term Productivity

Construction of a new runway and demolition/reconstruction of Runway 04/22 has the potential for a short-term effect to the groundwater and/or soil remediation process. Vehicle and heavy equipment operations have the potential to damage monitoring wells, lines, and/or remediation systems. Consultation with EM would be required prior to project activities in order to minimize this potential.

4.8.2 Alternative A Minimization Measures (Preferred Alternative)

The following minimization measures are required or recommended if Alternative A is chosen.

- a. All earthwork should be planned and conducted to minimize the duration that soils would be left unprotected. The extent of the area of disturbance necessary to accomplish the project should be minimized. Ground-disturbing activities should be delayed during high-wind conditions (in excess of 25 mph). Vehicular traffic, grading, and digging should not be permitted in the project area during high-wind conditions.
- b. Exposed surfaces should be periodically sprayed with water.
- c. Fill material shall be delivered according to all applicable Federal, State, and local regulations regarding the transport of fill material. Contact EM for assistance.
- d. Asphalt should be recycled where possible and used in conjunction with fill materials to reduce the requirement for fill materials.
- e. Project activities are located in close proximity to ERP monitoring wells, underground ERP monitoring lines, and remediation equipment. Prior to starting work on the project, the proponent/contractor shall contact the 95 ABW/EMR (Environmental Management Remediation Division) J-TECH contractor to identify the location of ERP equipment to the proponent. Damage to ERP equipment must be avoided.

4.8.3 Alternative B Impacts

Since Runway 04/22 would not be demolished and reconstructed under this alternative, there would be no activities in the vicinity of groundwater and/or soil remediation systems located in ERP Sites 71 and 88, and, therefore, no potential for impact to ERP site remediation. Therefore, ERP site disturbance impacts would be less than those anticipated for Alternative A.

4.8.4 Alternative B Minimization Measures

The minimization measures would be the same as those described for Alternative A.

4.8.5 Alternative C Impacts

Under this alternative, construction and/or demolition/reconstruction activities would not occur. Therefore, Runway 04/22 would continue to degrade and FOD-related emergencies would continue to increase. Repairs would continue to be conducted as necessary until complete failure of runway occurs. Therefore, no additional impacts to geology and soils are anticipated.

4.8.6 Alternative C Minimization Measures

No new minimization measures are required or recommended beyond those currently being implemented.

4.9 Socioeconomics

4.9.1 Alternative A Impacts (Preferred Alternative)

4.9.1.1 Fiscal Growth

The proposed project would provide a short-term positive, incremental impact to the economy of the Antelope Valley from increased revenue generation. This increase in revenue is expected to occur as a result of money spent off Base for construction materials and services. The total project is estimated at approximately \$106M.

4.9.1.2 Direct/Indirect Effects

Construction of a new runway and demolition/reconstruction of Runway 04/22 would have a positive direct effect to the economy of the Antelope Valley from increased revenue generation. Indirect effects would be minimal as the construction of a new runway and demolition/reconstruction of Runway 04/22 is anticipated to occur over 3 fiscal years.

4.9.1.3 Short-Term Use Versus Long-Term Productivity

Construction of a new runway and demolition/reconstruction of Runway 04/22 would have a short-term effect to the local economy with the increased revenue generated from project activities. Construction of a new runway and demolition/reconstruction of Runway 04/22 would have a beneficial long-term effect by reducing repair and maintenance costs; reducing the potential for FOD hazards to aircraft and their pilots; and providing a runway system with materials with the longest usable life, least maintenance, and lowest possible cost.

4.9.2 Alternative A Minimization Measures (Preferred Alternative)

No minimization measures are required or recommended.

4.9.3 Alternative B Impacts

Under this alternative, project activities are anticipated to take approximately 1 year less than Alternative A. The total project cost is estimated at approximately \$105M. Therefore, impacts to socioeconomics would only be slightly less than those anticipated for Alternative A.

4.9.4 Alternative B Minimization Measures

No minimization measures are required or recommended.

4.9.5 Alternative C Impacts

Under this alternative, construction and/or demolition/reconstruction activities would not occur. Therefore, Runway 04/22 would continue to degrade and FOD-related emergencies would continue to increase. Repairs would continue to be conducted as necessary. Complete failure of the runway is anticipated to occur in FY08. Therefore, no additional increase in revenue to the local economy would occur as a result of this alternative.

4.9.6 Alternative C Minimization Measures

No minimization measures are required or recommended.

4.10 Infrastructure

4.10.1 Alternative A Impacts (Preferred Alternative)

4.10.1.1 Transportation System

Proposed project activities have the potential to impact the transportation system through traffic delays or temporary closure of roadways. Traffic delays are anticipated due to slow-moving equipment using existing roadways. These impacts would be expected to be short-term, lasting only as long as required to accomplish the work. Road closures or the rerouting of traffic would be temporary; lasting only as long as was necessary to ensure personnel safety while the required work was completed. Early coordination with Base organizations would ensure necessary safety precautions are taken, and would allow ample advance notice to affected commuters and personnel. The main routes, Rosamond Boulevard, Lancaster Boulevard, and Jones Road, can support all vehicular traffic. However, repeated loading may cause rutting on the pavement. No significant impacts are anticipated.

4.10.1.2 Utilities

Proposed project activities have the potential to impact existing utility lines such as water, electrical, communications, stormwater, and/or sanitary sewer systems through accidental penetration of the lines. This could result in service interruption and the repair and/or replacement of a severed utility line. However, with the implementation of the recommended minimization measures, no adverse impacts are anticipated.

4.10.1.3 Direct/Indirect Effects

Construction of a new runway and demolition/reconstruction of Runway 04/22 would have a noticeable direct effect on traffic congestion in the area during construction activities. Possible roadway breakup or pavement rippling impacts would also have a direct effect on traffic congestion in the area during construction activities. This could also cause an increase in FOD and other airborne dust. Indirect effects would also include the slowdown of traffic to regulated speeds.

4.10.1.4 Short-Term Use Versus Long-Term Productivity

Construction of a new runway and demolition/reconstruction of Runway 04/22 would have a short-term effect on inbound and outbound Base traffic on Lancaster Boulevard. Construction of a new runway and demolition/reconstruction of Runway 04/22 would have a beneficial long-term effect to the local AF mission by providing a safe and reliable takeoff strip, reducing the potential for FOD hazards to aircraft and their pilots, and providing a runway system that would meet the standards for current and future flight test activities.

4.10.2 Alternative A Minimization Measures (Preferred Alternative)

The following minimization measures are required if Alternative A is chosen.

- a. All work that would affect closure, rerouting, or modification of roadways, streets, or highways shall be coordinated 15 days in advance with the Security Forces, Base Fire Department, and Public Affairs Office. A current copy of the California Department of Transportation *Manual of Traffic Controls for Construction and Maintenance Work Zones* (California Department of Transportation 1990) shall be used as guidance for traffic signs.
- b. The proponent/contractor shall be responsible for obtaining an AFFTC IMF 5926, *Edwards AFB Civil Engineering Work Clearance Request* (digging permit). Contact the Base Civil Engineer Infrastructure Controller for coordination.
- c. Some utilities require a representative to be present on site at all times when motorized construction equipment is being used closer than 20 feet from existing lines. The project sponsor shall coordinate with the Civil Engineer Group in order to identify the location of affected lines.
- d. If current as-built drawings indicating existing utility lines are not available, no mechanical digging can be performed within 4 feet of utilities or communication cables until they are physically exposed by hand digging.

4.10.3 Alternative B Impacts

Under this alternative, project activities would occur in the same area as Alternative A. Therefore, impacts to the transportation and utility systems would be the same as those anticipated for Alternative A.

4.10.4 Alternative B Minimization Measures

The minimization measures would be the same as those described for Alternative A.

4.10.5 Alternative C Impacts

Under this alternative, construction and/or demolition/reconstruction activities would not occur. Therefore, Runway 04/22 would continue to degrade and FOD-related emergencies would continue to increase. Repairs would continue to be conducted as necessary. Therefore, no additional impacts to the transportation and utility systems are anticipated.

4.10.6 Alternative C

4.10.7 Minimization Measures

No new minimization measures are required or recommended beyond those currently being implemented.

4.11 NEPA Mandated Analysis

Construction of a new runway and demolition/reconstruction of Runway 04/22 would affect certain aspects of the environment. These aspects have been evaluated together with five additional impacts, which include:

- a. Direct/Indirect Effects,
- b. Short-Term Use Versus Long-Term Productivity,
- c. Cumulative Effects,
- d. Unavoidable Adverse Effects, and
- e. Irreversible and Irretrievable Commitments of Resources.

The evaluation of direct/indirect effects and short-term/long-term effects are presented in the discussion of the affected environment in Section 4.0, Environmental Consequences. A discussion of cumulative effects, unavoidable adverse effects, and irreversible and irretrievable commitments of resources are discussed separately.

4.11.1 Cumulative Impacts

The CEQ regulations implementing NEPA require agencies to consider the potential for cumulative impacts of the proposed actions. “Cumulative impact” is defined in 40 CFR 1508.7 as “the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions.” Past projects, or those implemented or built before 2003, can be considered to be part of the existing environment conditions baseline presented in this EA. Included within the concept of past projects are all maintenance activities, land development projects, and other actions that occurred before detailed analysis began on this EA. Cumulative impacts can result from individually minor, but collectively significant actions taking place over time.

Present projects occurring on the Base include repavement and regrading of roads, construction of the Base Operations Facility, demolition/replacement of older military family housing, and demolition of surplus family housing units. The long-term cumulative impacts from these activities would be minimal since most of these activities are continuing operations or maintenance to existing structures that are already part of the existing baseline conditions and only a small percentage are new construction.

Proposed projects for the Main Base area of Edwards AFB include renovation and construction of facilities to accommodate additional flight test missions and upgrading the

existing munitions complex. The implementation of these proposed projects is not guaranteed and would depend upon program funding in outlying years.

For the Preferred Alternative, the construction of a new runway and demolition/reconstruction of Runway 04/22 would be compatible with the existing use of the area as described in the Base General Plan. Impacts to physical resources (e.g., noise, air quality, erosion) related to construction activities would not contribute substantially to cumulative impacts since they are typically localized and temporary. Long-term noise impacts to adjacent areas following completion of a new runway would also be negligible. There would be no demands on regional utilities to provide sanitary services or telephone and other communication services. Impacts on solid and hazardous waste services and activities as well as energy demands for construction equipment and worker transportation would be well within existing capabilities for the area. Impacts to geology and soils also would not contribute substantially to cumulative impacts since they would be localized and temporary. Long-term impacts to these resources from the implementation of the Preferred Alternative would be minimal, as discussed throughout Section 4.0, Environmental Consequences.

Implementation of the Preferred Alternative would enhance the economics of the local area through the purchase of construction materials and by providing jobs for the duration of the project. In addition, construction personnel would utilize services both on and off Base. Regionally, on a city or State level, the changes in employment income and other economic indicators as a result of the influx of construction personnel would remain relatively insignificant to the total regional economy and would not represent any significant cumulative impact.

Under Alternative B, cumulative impacts would be similar to those anticipated under Alternative A.

Under Alternative C – the No Action Alternative, Runway 04/22 would continue to degrade and FOD-related emergencies would continue. These FOD-related emergencies result in flight delays, substantial monetary losses, and increased potential for the loss of life. Even with routine maintenance and repair activities, Runway 04/22 would continue to degrade to complete failure. Complete runway failure is anticipated to occur in FY08. There are no measures that would slow this degradation process. Therefore, the cumulative impact of the No Action Alternative would result in a negative impact on flight test activities at the AFFTC.

4.11.2 Unavoidable Adverse Effects

Unavoidable adverse effects include those that are negative, occurring regardless of any identified minimization measures.

- a. Physical Resources – Exposure of surface soils during construction activities would cause erosion, especially during wind and rain events. Short-term increases in suspended sediment loading due to soil erosion during construction activities would occur, impacting stormwater quality in the immediate vicinity. Construction activities would increase fugitive dust levels and emissions would occur from construction equipment and worker vehicles. Noise levels would increase during construction, but would only occur during normal work hours. Short-term unavoidable adverse effects would result from the

use of hazardous materials and the generation of hazardous and solid waste. A short-term unavoidable adverse effect would result in geology and soils from ERP site disturbance.

- b. Biological Resources – Approximately 1,650 acres of disturbed and undisturbed land would be developed through implementation of any of the alternatives. Minimal impacts to wildlife species would occur as a result of this project.
- c. Socioeconomic Resources – Long-term commitments of resources would result directly from operation and maintenance of the proposed project alternatives. Construction materials would also be long-term commitments. All of the proposed project alternatives would positively benefit the local area in terms of economic activity, employment, and income. Local services such as police, fire, and emergency medical services would not be adversely impacted.

Under the No Action Alternative, a new runway would not be constructed and Runway 04/22 would continue to degrade to a point where the runway would be unusable. The FOD problems associated with runway degradation would require more frequent FOD screens. Associated emergency repairs on Runway 04/22 would increase, with very little impact to the ultimate survivability of the runway. Other unavoidable adverse impacts from the No Action Alternative include safety and occupational health risks to aircraft and their pilots from FOD hazards.

4.11.2.1 Means to Mitigate or Minimize Adverse Environmental Impacts

Impacts to physical resources as a result of implementation of the Preferred Alternative would occur during proposed construction activities. Although the impacts would be short-term, contractors would have to adhere to environmental regulations regarding adverse impacts from soil erosion, noise, air pollution, water contamination, and other impacts that would affect the physical environment. Environmental impacts from the No Action Alternative would be minimal since no new development would occur.

4.11.3 Irreversible and Irretrievable Commitment of Resources

Irreversible commitments of resources entail the consumption of or adverse effect upon resources that cannot be reversed or persists for an extremely long period of time. Irretrievable commitments of resources are those that are consumed, or affect resources for a short period of time that would be restored over time. Irreversible and irretrievable commitment of resources would result from any of the proposed project alternatives. Implementation of any of the proposed project alternatives would require the commitment of labor, capital, energy, construction materials, and land resources. Short-term commitments include labor, capital, and fossil fuels that result directly from construction activities and indirectly from the provision of services to the proposed site during construction.

Long-term commitments of resources would result directly from maintenance of a new runway as well as Runway 04/22. Construction materials would also be long-term commitments. Duration of the commitment of land resources would depend upon the lifespan of the runways. Since the anticipated lifespan of Runway 04/22, with demolition/reconstruction, and one of the new proposed runway construction alternatives is approximately 40 years, the commitment of land resources is a long-term commitment.

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Under the No Action Alternative, the commitment of resources would be limited to labor, capital, fossil fuels, and materials used for continued repairs to Runway 04/22, ceasing at the point of complete runway failure.

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6.0 LIST OF PREPARES AND REVIEWERS

The following people were responsible for the preparation or review of the *Environmental Assessment for the Repair, Reconstruction, and/or Replacement of the Main Base Runway, Edwards Air Force Base, California.*

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7.0 LIST OF AGENCIES AND ORGANIZATIONS TO WHOM COPIES OF THE ENVIRONMENTAL ASSESSMENT ARE SENT

Federal Agencies

AFFTC Technical Library – Building 1400, Edwards AFB, California

Edwards Base Library, 95th Mission Support Group (95 MSG/SVRL), Edwards AFB, California

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APPENDICES



August 2004

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**APPENDIX A
AIR EMISSION CALCULATIONS AND
CONFORMITY LETTER**

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1.0 ASSESSMENT METHODOLOGY

1.1 Emissions Calculations for Construction and Demolition/Reconstruction Activities

Project-related construction activities with the potential to contribute to air quality effects include the combustion of fossil fuels in equipment and vehicles used in construction and fugitive dust from construction activities. To estimate emissions for construction of the proposed projects, lists of the types of construction equipment and estimates of the length of time the equipment would need to operate were developed based on experience with construction of similar facilities at other locations (Gowder 2004). Uncontrolled criteria pollutant emissions associated with the following types of construction activities were estimated:

- a. On-road vehicle exhaust from trucks and cars delivering or hauling construction materials, demolition debris, or employees;
- b. Off-road equipment exhaust from operation of construction and other off-road equipment;
- c. Asphalt off-gassing;
- d. Fugitive dust associated with grading;
- e. Fugitive dust associated with vehicle travel on paved and unpaved roads;
- f. Fugitive dust associated with truck dumping and material handling; and
- g. Fugitive dust associated with disturbance of exposed graded surfaces.

Emission factors from a number of references were used to estimate exhaust emissions and fugitive dust associated with operation of the construction equipment. These references included the *URBEMIS2002* model (Version 7.4.2; Jones & Stokes Associated 2003), the South Coast Air Quality Management District (SCAQMD) *California Environmental Quality Act Air Quality Handbook* (SCAQMD 1993), the El Dorado Air Pollution Control District (EDAPCD) California Environmental Quality Act (CEQA) Guide (EDAPCD 2002), and the Sacramento Metropolitan Air Quality Management District (SMAQMD) *Roadway Construction Emissions Model, Revised Version 5.1* (SMAQMD 2004).

Construction equipment usage was estimated based on a schedule of construction tasks for each type of construction activity. Specific construction information used to estimate average daily (pound per day [pound/day]) and annual construction emissions (tons per year [ton/year]) included:

- a. Fuel type and the number and type of construction equipment to be used;
- b. Equipment usage rates (hours per day [hour/day], days per construction activity);
- c. Number of construction workers onsite during a typical peak construction day;
- d. Maximum acreage under construction or disturbed on a typical peak day; and
- e. Vehicle miles traveled (VMT) by dump trucks, tractor trailers, water trucks, and construction workers.

In addition, fugitive dust sources were evaluated, including grading and excavation, entrained dust from travel on paved and unpaved roads, demolition, and other types of soil disturbance.

Fugitive dust emission estimates were based on emission factors for uncontrolled conditions. Sources on Base would be mitigated through continuous application of water for dust control.

1.2 Emission Calculations for Operation of Asphalt and Batch Plants

The construction contractor would permit and operate two different types of batch plants to complete the runway project. Emission estimates for the drum mix asphalt plant were made using information obtained from *Compilation of Air Pollutant Emission Factors, AP-42, Fifth Edition, Volume I: Stationary Point and Area Sources*, Section 11.1, Hot Mix Asphalt Plants (U.S. EPA 2004). This reference provided emission rates for criteria pollutants in units of pounds per ton of material processed. It was assumed that fabric filters would be used to control particulate matter less than or equal to 10 microns (PM10) emissions from sources that vent to the atmosphere. Emissions attributed to the “off-gassing” of the asphalt were also estimated.

Emission factors for PM10 for the operation of the central mix drum concrete batch plant were also obtained from AP-42, Section 11.12, Concrete Batching (U.S. EPA 2001). Emission factors were provided in units of pounds per ton of concrete processed. The emission calculations assumed that standard particulate matter (PM) emission controls would be used during cement unloading, supplemental cement activities, and mixer loading. The PM emissions attributed to the transfer of sand and aggregate into the weigh hopper were assumed to be uncontrolled.

Batch plant emissions were estimated in terms of pound/day and ton/year.

2.0 PROJECT PHASES

The preferred alternative, or proposed project, would occur in two construction phases. Phase 1 would involve constructing a new asphalt runway that would be used by aircraft while the existing Runway 04/22 surface is demolished and rebuilt. Phase 1 activities would consist of site grading, delivery of underlay materials, compaction, and paving. Runway lighting systems would also be installed. Phase 1 is programmed to occur in FY06 and is estimated to take approximately 4 months. The new asphalt runway would be approximately 12,000 feet long and 200 feet wide in size and would include overrun areas, for a total area roughly equivalent to 64.3 acres.

Construction Phases 2 and 3 would involve demolition of the existing concrete runway surface and resurfacing. One-half of Runway 04/22 would be reconstructed at a time during Phases 2 and 3. Activities would consist of demolition, removal of demolition waste, delivery and grading of underlay materials, compaction, and pouring a new concrete surface. Phase 2 is programmed to occur in FY07 and is estimated to take approximately 7 months. Phase 3 is programmed to occur in FY08 and would also take approximately 7 months. The existing runway is approximately 15,000 feet long by 300 feet wide in size, which is equivalent to 103.3 acres. Each half of the existing runway project (Phases 2 and 3) involves replacing approximately 51.6 acres at a time.

3.0 CONSTRUCTION EMISSION CALCULATIONS

Information about the number and types of vehicles and equipment to be used was provided by Mr. Butch Gowder from the contracting firm of Post, Buckley, Schuh & Jernigan, Inc. (PBS&J).

Mr. Gowder estimated the typical operations for equipment during each phase of the proposed project. Project phases were divided into different types of activities, including asphalt, grading, demolition, delivery, concrete, and electrical operations. Construction activities during all phases were planned for 12 hour/day and 6 days per week (day/week). For each phase of the project, a daily usage factor was provided for each vehicle or piece of equipment.

A variety of on-road vehicles and off-road equipment would be used to conduct the proposed project. On-road vehicle types include heavy-duty tractor/trailers; and dump, flatbed, delivery, water, pickup, and boom trucks. Off-road equipment types include pavers, rollers, brooms, loaders, dozers, backhoes, trenchers, generators, compactors, mixers, and motor graders. The off-road construction equipment and a portion of the on-road pickup trucks were assumed to be diesel fueled. The following three sections summarize the assumptions and calculations used to estimate construction emissions due to on-road vehicle exhaust, off-road construction equipment exhaust, and fugitive dust.

3.1 On-Road Vehicle Activities and Exhaust Emissions

Exhaust emission factors representing each on-road vehicle were compiled from the *URBEMIS2002* model. This model provides criteria pollutant factors in terms of average grams per mile (grams/mile) for on-road vehicles.

The *URBEMIS2002* model uses the California Air Resources Board (CARB) *EMFAC2002* model to calculate on-road vehicle emissions factors. A variety of vehicle types are classified by vehicle weight and fuel type, and emission factors are provided for various speeds for each vehicle class. Representative on-road vehicle classes were used in the calculations. Table A-1 summarizes the on-road vehicle classifications and project VMT used to estimate vehicle exhaust emissions.

**TABLE A-1
ON-ROAD VEHICLE CLASSIFICATION, USAGE, AND DAILY VEHICLE MILES TRAVELED**

On-road Vehicle Type	EMFAC2002 Classification	Construction Phase Ranges	
		Usage (hour/day)	VMT/day
Pickup, Gasoline ¹	LDT2	1.0 to 6.0	70 to 156
Pickup, Diesel ¹	LDT2 DSL	1.0 to 6.0	70 to 156
Dump Truck	HHD	Up to 9.6	Up to 320
Delivery Truck ¹	HHD	Up to 9.6	Up to 320
Water Truck ¹	HHD	3.0 to 8.0	75 to 147
Tractor/trailers	HHD	0.6 to 1.8	20 to 63
Flatbed truck ¹	MHD	1.2 to 3.0	72 to 135
Flatbed truck ¹	MHD	3.6 to 7.8	75 to 303

Notes: 1. LDT DSL – light duty truck diesel
 2. HHD – heavy heavy duty
 3. MHD – medium heavy duty

¹Employee commute vehicle miles traveled included with these vehicle types.

Assumptions were made to account for the VMT by each on-road vehicle during each phase. The VMT assumptions were based upon the number of hours/day that each vehicle would be operated, typical job duties, roadway speeds, representative haul distances, and employee

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commutes to the work site. For example, during some phases, the on-road dump trucks were assumed to have a daily usage factor of 0.85 during a 12-hour day. Therefore, the dump trucks were anticipated to actually operate for 9.6 hours/day. These trucks must travel great distances to complete their load deliveries. Four round-trips per day can be made by each dump truck during this time. Each round trip was assumed to be 80 miles in length to travel to and from an off-Base location. This interval allows time for loading or unloading of the materials at each end of the trip.

The criteria pollutant exhaust emission factors in *URBEMIS/EMFAC2002* are expressed in units of grams/VMT, at a specified speed, for each vehicle class. Emission factors were compiled to represent the 2007 vehicle fleet mix for each class of vehicle. An average speed of 35 mph was assumed for each vehicle. Table A-2 presents the emission factors for each type of on-road vehicle.

**TABLE A-2
EMFAC2002 EMISSION FACTORS**

Vehicle Type	EMFAC Vehicle Classification	Pollutant Emissions (grams/mile)				
		VOC	CO	NOx	PM10	SOx
Construction Activity: Grading/Demolition						
Tractor/Trailers	Heavy Heavy Duty (HHD)	0.724	4.482	10.603	0.243	0.020
Pickup – Diesel	Light duty truck diesel (LDT2 DSL)	0.105	0.477	1.054	0.055	0.003
Pickup – Gas	LDT2 ALL	0.140	4.604	0.528	0.020	0.004
Flatbed Truck	Medium Heavy Duty (MHD)	0.350	3.618	2.517	0.216	0.013
Boom Truck	MHD	0.350	3.618	2.517	0.216	0.013
Water Truck	HHD	0.724	4.482	10.603	0.243	0.020
Construction Activity: Delivery						
Pickup – Diesel	LDT2 DSL	0.105	0.477	1.054	0.055	0.003
Pickup – Gas	LDT2 ALL	0.140	4.604	0.528	0.020	0.004
On-Road Dumps	HHD	0.724	4.482	10.603	0.243	0.020
Tractor/Trailers	HHD	0.724	4.482	10.603	0.243	0.020
Construction Activity: Concrete						
On-Road Dumps	HHD	0.724	4.482	10.603	0.243	0.020
Pickup – Diesel	LDT2 DSL	0.105	0.477	1.054	0.055	0.003
Pickup – Gas	LDT2 ALL	0.140	4.604	0.528	0.020	0.004
Flatbed Truck	MHD	0.350	3.618	2.517	0.216	0.013
Boom Truck	MHD	0.350	3.618	2.517	0.216	0.013
Water Truck	HHD	0.724	4.482	10.603	0.243	0.020
Construction Activity: Electrical						
Pickup – Diesel	LDT2 DSL	0.105	0.477	1.054	0.055	0.003
Pickup – Gas	LDT2 ALL	0.140	4.604	0.528	0.020	0.004
Flatbed Truck	MHD	0.350	3.618	2.517	0.216	0.013

Note: Data represents 2007 vehicle fleet at a temperature of 75 degrees F, 50 percent relative humidity, and 35 miles per hour (mph).

3.2 Off-Road Equipment Exhaust Emissions

The *URBEMIS2002* model uses typical horsepower ratings and load factors for off-road construction equipment along with the CARB *Off-Road* model emission factors to estimate construction equipment exhaust emissions. The off-road equipment emission factors are in units of grams per brake horsepower-hour (grams/bhp-hr). Table A-3 summarizes the horsepower and load factors from *URBEMIS2002* used to calculate exhaust emissions.

TABLE A-3
OFF-ROAD EQUIPMENT HORSEPOWER RATINGS AND LOAD
FACTORS FROM *URBEMIS2002*

Off-Road Equipment Type	URBEMIS2002 Equipment Classification	Horsepower Rating	Load Factor
Paver	Paver	132	0.590
Roller	Roller	114	0.430
Broom	Other Construction Equipment	190	0.620
Loader	Rubber-tired Loader	165	0.465
Dozer	Crawler Tractor	352	0.590
Pan	Other Construction Equipment	190	0.620
Backhoe	Other Construction Equipment	190	0.620
Trencher	Trencher	82	0.695
Generator	Other Construction Equipment	190	0.620
Compactor	Other Construction Equipment	190	0.620
Motor Grader	Grader	174	0.575
Spreader	Other Construction Equipment	190	0.620
Cure Texture	Other Construction Equipment	190	0.620
Blower	Other Construction Equipment	190	0.620
Crane	Crane	190	0.430

Daily exhaust emissions were computed using the daily usage factors for each piece of equipment, the CARB off-road emission factors, horsepower, and load factors. The emissions from each construction activity were summed to calculate the annual emissions in ton/year.

3.3 Fugitive Dust Emissions

Fugitive dust from project construction activities would be created from construction grading and vehicular roadway activities. Emission factors for entrained road dust were obtained from the *URBEMIS2002* model for paved and unpaved roads. These emission factors are expressed in units of pounds per vehicle miles traveled (lb/VMT), with unpaved roads being much more emissive. It was assumed that 1 percent of the total VMT for each on-road vehicle would occur on unpaved roads. Emission estimates provided assume that the dust would not be mitigated. However, several methods would be available (speed control, watering, and chemical treatments) to reduce the amount of dust created by travel on unpaved roads.

Fugitive dust emission factors due to off-road construction/grading activities were obtained from the CEQA Guidance Document prepared by the El Dorado County Air Pollution Control District (APCD). These construction dust factors are expressed in units of pounds per acre (pound/acre) disturbed. The project acreage was determined from the square footage of the individual phases associated with each activity. Fugitive dust impacts from grading activities can be mitigated by the application of water to the soil.

Dust emission factors due to the dumping of truck materials were also obtained from the CEQA Guidance Document prepared by the El Dorado County APCD. These emission factors are expressed in units of pounds per ton (pound/ton) of material dumped. Material dumping would occur during grading activities, asphalt batching, and concrete batching.

Dust emissions due to the delivery truck dumps of underlay material for the construction of the temporary asphalt runway (Construction Phase 1) were calculated based upon the weight of material delivered. It was estimated that 1/4-0 gravel would be used, and that it would weigh 1.22 tons per cubic yard. The volume of underlay material was estimated by the 12,000- by 200-foot size of the runway, plus overrun areas, and by assuming that the underlay would be 4 feet deep.

The demolished concrete from the old runway (Construction Phases 2 and 3) was assumed to weigh 140 pounds per cubic foot of material removed. The 15,000- by 300-foot runway concrete surface was assumed to be 1.5 feet deep. Approximately 236,250 tons of concrete would be removed from the runway, and dumped each year. This represents one-half of the total runway surfaces being removed each year.

4.0 EMISSIONS ESTIMATION RESULTS FOR RUNWAY CONSTRUCTION AND REPLACEMENT

Table A-4 presents the estimated construction emissions in ton/year for the proposed FY06 construction year (Construction Phase 1).

**TABLE A-4
TOTAL EMISSIONS DURING CONSTRUCTION PHASE 1 (FY06)**

Emission Source (1 Year)	CO	NO _X	VOC	SO _X	PM
	ton/year	ton/year	ton/year	ton/year	ton/year
On-Road Truck and Vehicle Exhaust	14.0	29.5	2.1	0.1	0.7
Off-Road Equipment Exhaust	19.3	18.2	2.5	0.0	0.8
Asphalt Off-Gassing	N/A	N/A	0.1	N/A	N/A
Fugitive Dust from Grading	N/A	N/A	N/A	N/A	0.8
Fugitive Dust from Road Travel	N/A	N/A	N/A	N/A	37.9
Fugitive Dust from Material Handling	N/A	N/A	N/A	N/A	2.0
Fugitive Dust from Disturbed Areas	N/A	N/A	N/A	N/A	0.9
Total Emissions	33.3	47.7	4.7	0.1	43.1

Note: 1. FY – fiscal year

2. CO – carbon monoxide

3. NO_X – oxides of nitrogen

4. VOC – volatile organic compound

4. SO_X – sulfur oxides

5. PM – particulate matter

6. N/A – Not Applicable

Table A-5 presents the estimated total construction emissions in ton/year for the proposed 2007 and 2008 construction years. These years would represent the highest level of construction activity and emissions, representing the “peak construction year.” Emissions are estimated to be the same for both years.

**TABLE A-5
TOTAL EMISSIONS DURING CONSTRUCTION AND REPLACEMENT ACTIVITIES IN THE
ESTIMATED PEAK CONSTRUCTION YEAR (FY07 AND FY08)**

Emission Source (1 Year)	CO	NO_X	VOC	SO_X	PM
	ton/year	ton/year	ton/year	ton/year	ton/year
On-Road Truck and Vehicle Exhaust	18.4	37.8	2.7	0.1	0.9
Off-Road Equipment Exhaust	30.9	28.2	4.0	0.0	1.2
Fugitive Dust from Grading	N/A	N/A	N/A	N/A	0.6
Fugitive Dust from Road Travel	N/A	N/A	N/A	N/A	47.9
Fugitive Dust from Material Handling	N/A	N/A	N/A	N/A	1.1
Fugitive Dust from Disturbed Areas	N/A	N/A	N/A	N/A	0.7
Total Emissions	49.3	66.0	6.7	0.1	52.4

- Note:
1. FY – fiscal year
 2. CO – carbon monoxide
 3. NO_X – oxides of nitrogen
 4. VOC – volatile organic compound
 5. SO_X – sulfur oxides
 6. PM – particulate matter
 7. N/A – Not Applicable

5.0 BATCH PLANT EMISSIONS

Two different batch plants would be required to complete the proposed project. The emissions from the two types of plants have been estimated. Daily emissions were calculated using estimates of maximum daily output of asphalt or concrete, because this would be the basis for local air quality permits. Annual emissions were calculated using the assumptions regarding plant outputs and total material requirements provided by Mr. John W. Stephens, Edwards AFB 95th Air Base Wing (Functional Area Staff) (95 ABW/CEC).

The temporary asphalt runway (Construction Phase 1) would use an onsite “drum mix asphalt batch plant” that would have an average output of 4,000 tons/day of material and a maximum of 8,000 tons/day. It was assumed that the plant would produce 102,000 tons of material to complete paving the temporary runway (Stephens 2004).

Resurfacing the main concrete runway during Construction Phases 2 and 3 would require that a “central mix drum concrete batch plant” be established on site. It was assumed that the plant would have an average output of 6,000 tons/day, a maximum output of 12,000 tons/day, and that 500,000 tons of concrete would be required to complete the project over 2 years. Therefore, the plant would produce 250,000 tons of concrete each year (Stephens 2004).

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Table A-6 presents the annual emission estimates for operation of the proposed batch plants.

TABLE A-6
ESTIMATED TOTAL ANNUAL EMISSIONS DURING BATCH PLANT OPERATIONS

Emission Source	CO	NO _X	VOC	SO _X	PM10
	ton/year	ton/year	ton/year	ton/year	ton/year
Drum Mix Asphalt Batch Plant	6.6	1.3	1.6	0.2	1.2
Central Mix Drum Concrete Batch Plant	N/A	N/A	N/A	N/A	2.0
Total Batch Plant Operations	6.6	1.3	1.6	0.2	3.2

Note:

1. CO – carbon monoxide
2. NO_X – oxides of nitrogen
3. VOC – volatile organic compound
4. SO_X – sulfur oxides
5. PM10 – particulate matter less than 10 microns in diameter. For asphalt drum mix plant, emissions calculations assumed fabric filter control of sources that vent to the atmosphere.
6. N/A – Not Applicable



DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 95TH AIR BASE WING (AFMC)
EDWARDS AIR FORCE BASE, CALIFORNIA

MEMORANDUM FOR AFFTC/CV

FROM: 95 ABW/EM
5 East Popson Avenue, Building 2650A
Edwards AFB CA 93524-1130

SUBJECT: Clean Air Act General Conformity Statement for Control No. 01-896, *Repair, Reconstruction, and/or Replacement of the Main Base Runway*

1. The following finding is made regarding the need for a general conformity demonstration under the *Clean Air Act* with respect to the Proposed Action.

a. The Proposed Action is located in the Kern County Air Pollution Control District (KCAPCD). Under regulations promulgated pursuant to the *Clean Air Act*, Title 42 United States Code (USC) Part 7506 (c), the portion of the project area regulated by the KCAPCD is located in an attainment/maintenance area for ozone. The *de minimis* level set for this area for emissions of ozone precursor pollutants (volatile organic compounds [VOC] or oxides of nitrogen [NO_x]), in accordance with Title 40 Code of Federal Regulation (CFR) Part 51.853/93.153 (b)(1) and KCAPCD Rule 210.7, is up to 100 tons per pollutant (VOC or NO_x) per year per action.

b. For the KCAPCD, the 1990 regional planning baseline emission inventories for ozone precursor pollutants are included in the 1994 *California Ozone State Implementation Plan*. The baseline planning values for KCAPCD are 14,965 and 6,205 tons per year of NO_x and VOC, respectively. In accordance with 40 CFR 93.153, the 10-percent threshold values for determination of regional significance for KCAPCD are 1,496.5 and 620.5 tons per year of NO_x and VOC, respectively.

c. It has been determined that the relevant air emissions for this action are 66.0 tons of NO_x and 6.7 tons of VOC per year. The direct and indirect emissions, when totaled, are less than the *de minimis* levels specified in 40 CFR 51.853/93.153(b)(1), and are less than the 10-percent threshold values for determination of regional significance; therefore, the project is presumed to conform and a conformity determination is not required.

2. Should you have any questions with respect to this finding, please direct them to James Specht at (661) 277-1411.

*Gerald E. Callahan*¹⁶
GERALD E. CALLAHAN, Chief
Environmental Quality Division

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